UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

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TEVA PHARMACEUTICALS USA, INC., TEVA PHARMACEUTICALS INDUSTRIES LTD., TEVA NEUROSCIENCE, INC. and YEDA RESEARCH AND DEVELOPMENT CO. LTD.,

Plaintiffs,

v. 08-CV-7611 (BSJ)

SANDOZ, INC., SANDOZ INTERNATIONAL GMBH, NOVARTIS AG, and MOMENTA PHARMACEUTICALS, INC.,

Defendants.

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TEVA PHARMACEUTICALS USA, INC., TEVA PHARMACEUTICALS INDUSTRIES LTD., TEVA NEUROSCIENCE, INC. and YEDA RESEARCH AND DEVELOPMENT CO. LTD.,

Plaintiffs,

v. 09-CV-8824 (BSJ)

MYLAN PHARMACEUTICALS INC., MYLAN INC., NATCO PHARMA LTD.,

Defendants. Non-Jury Trial

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New York, N.Y.
September 9, 2011
9:40 a.m.

Before:

HON. BARBARA S. JONES,

District Judge

APPEARANCES

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ALSO PRESENT: CORT CHASE, Litigation Support

(Trial resumed; in open court)

MR. WIESEN: Good morning, your Honor. Before we proceed with Dr. Gokel I believe Mr. James has some logistical things he wants to address.

MR. JAMES: As we said yesterday there were a couple of things we wanted to follow up on in the Grant examination. We wanted to mark Dr. Grant's calculations for the molar fraction analyses for the Sandoz' products as PTX 931 and 932 and for the Mylan products Plaintiffs Trial Exhibits 933 and 934 and I'll hand those up in just a moment.

THE COURT: Okay. For the record, PTX 931 is slide 33 from yesterday's examination, PTX 932 is slide 40, PTX 933 was slide 46 and PTX 934 was slide 50. In addition to that, as we discussed yesterday, we had the agreement between the parties with respect to the redacted exhibits.

THE COURT: Yes.

MR. JAMES: So I'm going to hand up the redacted copies of PTX 300, that will be PTX 300R, PTX 312R, PTX 313R, PTX 318R and PTX 325R and PTX 330R. And then finally Mr. Wiesen mentioned to you I believe on the first day of trial that we had a stipulation between the parties with respect to pharmaceutical composition and pharmaceutically acceptable excipient and I'll hand those up to your Honor now. We have handwritten exhibit numbers on them. We'll hand up stamped copies in a while. For the Teva v. Mylan action will be PTX

935, that stipulation we'll mark as PTX 935 and Teva v. Sandoz matter we'll mark at PTX 936. Thank you, your Honor.

THE COURT: All right, thank you. There was no objection to the admission, at least I didn't hear one, of the various exhibits which were slides, so they're admitted. I had actually thought a couple of them were admitted yesterday. Maybe the offer was made, but I didn't announce it.

MS. BLOODWORTH: Your Honor, I think that's right. We were just handed the stamped copies, I think that's the only difference is that the stickers, the PTX numbers were added to the slides that were admitted.

(Plaintiff's Exhibits PTX 931 through 936 received in evidence)

(Plaintiff's Exhibits PTX 300R, PTX 312R, PTX 313R, PTX 318R and PTX 325R and PTX 330R received in evidence)

THE COURT: Okay, that's great. Go ahead.

MR. WIESEN: And, your Honor, before the questioning begins just a little bit of housekeeping from yesterday's, the beginning of Dr. Gokel's examination. I'm told I failed to offer PTX 270. PTX 294 I thought had been admitted but it was a different version of the certificate of analysis so I wanted to offer that and PTX 558, all of which we discussed with Dr. Gokel yesterday, so plaintiffs would offer those into evidence as well.

THE COURT: What was the last one?

MR. WIESEN: 558.

THE COURT: Any objections?

MR. ANSTAETT: No objection, your Honor.

THE COURT: All right, they're admitted.

(Plaintiff's Exhibits PTX 270, PTX 294, PTX 558 received in evidence)

GEORGE GOKEL,

called as a witness by the Plaintiff,

having been previously duly sworn, testified as follows:

DIRECT EXAMINATION

BY MR. WIESEN:

Q. Good morning, Dr. Gokel.

A. Good morning, Dr. Wiesen.

Q. I just want to go back for one minute to one of the slides we had at the end of the day yesterday to put up slide 79, just make sure it's clear on the record where a couple of the numbers on this slide came from. You recall we were discussing the different scales that you could use for a comparison of, to calculate molar ratios. Do you recall that testimony?

A. Yes, I do.

Q. And in the first pie chart you have here on slide 79, you have a total scale of 14. Do you see that?

A. Yes, I do.

Q. Where did the 14 come from?

A. The patent specifies a ratio of 6:2:5:1 approximately. And

if you sum six plus two plus five plus one it sums to 14.
Q. And on the middle pie chart you have a total scale of 10.8. Where did that come from?
A. That's a calculation that was done by Mylan in which they did some mathematical manipulations on some of their numbers and then we summed those numbers to the scale of 10.8.
Q. And so is that the sum of the molar ratio that Dr. Kent calculates when he does what he calls normalizing the tyrosine?
A. Yes, he normalizes the tyrosine to 1 and then adjusts the percentages of the others by the same factor and now the total of those numbers sums to 10.8 rather than 14.
Q. And just one more time, how would a person of ordinary skill in the art then compare the molar ratio that Dr. Kent has on a scale of 10.8 to the molar ratio of 6:2:5:1 on a scale of 14?
A. Well, we have to compare it on a scale that's the same, so if we multiply 10.8 by a factor that gives us 14, I think that's about 1.3, we could compare them directly on a scale of 14.
Q. Okay. Thank you, Dr. Gokel. I want to turn, then, to Sandoz' product and whether it is copolymer-1 as the Court has construed the term. Sir, are you aware of whether Sandoz Momenta have ever referred to their proposed product as copolymer-1?
A. Yes, I am.

Q. If you could turn to PTX 141 in your binder, please? I believe we looked at this document yesterday. Do you recall it?

A. Yes, I do.

Q. If you could turn to MMT391607?

A. Yes, I have it.

Q. Does Momenta refer to their proposed product at copolymer-1 in this overview?

A. Yes, they do. In the section they call nomenclature, they use the term copolymer-1.

Q. What other terms do they use under nomenclature?

A. They use the term glatiramer acetate, which is the top of this list of four names. They use the trademark name of Copaxone, copolymer-1, as we mentioned, and what's called a Chemical Abstracts Service registry number. And this is the number given here. It's a way of indexing known chemical compounds that the American Chemical Society does.

Q. And if you could just read into the record what molar fraction does Momenta have reported here for copolymer-1?

A. For glutamic acid, alanine, tyrosine and lysine, the numbers are .141, .427, .095 and .338.

Q. Thank you, sir. I want to run through as we did yesterday with Mylan's for the Court's construction of copolymer-1 and just ask about those terms. Do you have the next slide?

Sir, do you have an opinion whether Sandoz and

Momenta's proposed product in their ANDA is synthesized by polimyerization of suitably protected amino acid carboxyanhydrides?

A. Yes, I believe that it is.

Q. What is the basis for that opinion.

A. The basis is the discussion I offered yesterday in which we showed that carboxyanhydrides was the activated form of these protected amino acids.

Q. Sir, do you have an opinion whether Sandoz and Momenta's proposed ANDA product has a mixture of polypeptides?

A. Yes, I do.

Q. What is your opinion?

A. I believe it to be a mixture of polypeptides.

Q. What's the basis for that opinion, sir?

A. The basis of that is the synthetic sequence that we went through yesterday.

Q. Sir, do you believe that Sandoz and Momenta's proposed product is nonuniform with respect to molecular weight and sequence?

A. Yes, I do.

Q. What's the basis for that opinion?

A. The testimony of Dr. Grant.

Q. Sir, do you have an opinion whether Sandoz Momenta's proposed product is composed of alanine, glutamic acid, lysine and tyrosine?

A. Yes, I do.
Q. What's your opinion, sir?
A. Their starting materials are clearly stated in their synthetic scheme as using these four amino acids.
Q. And what's the basis for that opinion?
A. Their synthetic schemes clearly show that these four amino acids are present in their starting materials and as a result of the reaction that's conducted, they must be present in the product.
Q. Finally, sir, do you have an opinion whether Sandoz and Momenta's proposed product is in a molar ratio of approximately 6:2:5:1?
A. Yes, I do.
Q. And what's your opinion?
A. My opinion is it is in the ratio of approximately 6:2:5:1.
Q. All right, well, let's turn in a little more detail as well, hopefully we can go fairly quickly through the molar ratio analysis on Sandoz' proposed product. I want to look first at Sandoz' original ANDA filing. If you could turn to PTX 219 in your binder. You should have 219-R.
MR. WIESEN: This is another redacted document, your Honor.
A. Yes, I have it.
Q. If you turn to SDZ2024.
A. Yes, I have it. Oh, I'm sorry, I'm on 2004.

Q. 2024.
A. 2024, yes, I have it.
Q. What section of the ANDA is that?
A. This is Section 3.2.S.3.1.3.3.2. It's titled amino acid composition of building blocks by RPHPLC, or reverse phase PLC.
Q. Is this a document you analyzed in rendering your opinions in this case?
A. Yes, it is.
MR. WIESEN: Plaintiffs would offer PTX 219 into evidence, your Honor.
MR. DOYLE: No objection.
THE COURT: Admitted.
(Plaintiff's Exhibit PTX 219 received in evidence)
Q. If you look at the next page, 2025, and look at tables 26 and 27 and we actually pulled them out on slide 81 if you want so you can again focus on the slide. What's reported in table 26?
A. Table 6 is a summary of amino acid composition of the building blocks or the amino acid subunits of glatiramer acetate.
Q. We've highlighted one lot, 077K7277. Do you see that?
A. Yes, I do.
Q. Do you understand that to be one of the lots of Sandoz' proposed drug substance?
A. Yes, I do.

Q. Have you analyzed the molar ratio of that particular lot?
A. Yes, I have.
Q. Could we have the next slide, please? Could you explain what's in the first four columns of this slide?
A. Yes. I've done exactly the same kind of analysis that I did before for the four amino acids shown in the first column with the abbreviations that we're using here, the ratio 6:2:5:1 which sums to 14 as shown in the first numerical column. That is then scaled to 1 simply by dividing by 14, and that gives us the values that are shown in the second numerical column and then in lot 34, the numbers that are on page 2025 that we've been talking about are presented and they are summed to 1.
Then in the --
Q. Before you go on to the next column, sir, would a person of ordinary skill in the art consider the mole fractions scaled to 1 for 6:2:5:1 on this lot on slide 90 of Sandoz' proposed ANDA product to be approximately the same?
A. Could you repeat the question, please?
Q. Sure. Would a person of ordinary skill in the art consider the mole fraction for this lot of Sandoz' proposed product to be approximately the same as the mole fraction for 6:2:5:1?
A. I believe they would.
Q. How else could you compare the molar ratio of Sandoz' product to 6:2:5:1?
A. The way that I would do it, I believe, since the '808

patent family says use the values 6:2:5:1 to do this analysis is that I would simply multiply by 14 each value so that I get on the same scale and then I would compare the first numerical column with the fifth numerical column and that's, the first column has just been repeated here, and you can see that the ratios are 6:2:5:1 to one significant figure.

Q. And, sir, in your opinion would a person of ordinary skill in the art -- well, let me phrase it differently. Do you have an opinion whether this lot of Sandoz' proposed product is in a molar ratio of approximately 6:2:5:1?

A. Yes, I believe that it is.

Q. Thank you. And have you prepared another stack chart to show this comparison?

A. Yes, I have.

Q. What do we have on slide 91?

A. This is just another way to represent the same information that I showed you before. If we compare it on a scale of 1, which is as I've said before perfectly legitimate, we can see the proportions are similar, but it's more difficult to see even with this pull-out. So if we compare it by multiplying by 14, we can see that there is a very close relationship of these materials to each other.

Q. Thank you, sir. If we could have the next slide. We've put back up tables 26 and 27 from PTX 219 page SDZ2025 and we've highlighted three additional batches, 087K7253, CT0743

and CT0750. Have you conducted a similar analysis for these other three batches contained in Sandoz' original ANDA?
A. Yes, I have.
Q. And do you have an opinion whether these three additional batches have a molar ratio of approximately 6:2:5:1?
A. Yes. I believe them to meet that limitation.
Q. Thank you, sir. I want to turn, now, to PTX 913 in your binder. I believe this is another document that we have a redacted version of, is that right, Mr. Chase?
A. Mine is redacted.
Q. If you turn to page 28 of the document.
MR. WIESEN: Your Honor, if I could just have one moment to consult with counsel about confidentiality?
THE COURT: Okay.
(Pause)
MR. WIESEN: Thank you, your Honor.
THE COURT: Okay. The doctor and I were just discussing the use of his screen. All right, go ahead.
Q. Are you familiar with PTX 913? You reviewed the document a minute ago.
A. Yes, I'm sorry, I just missed my focus for a moment. Yes, I have reviewed it.
MR. WIESEN: The defendants offer PTX 913, or plaintiffs offer PTX 913, your Honor.
MR. DOYLE: No objection, your Honor.

THE COURT: Admitted.

(Plaintiff's Exhibit PTX 913 received in evidence)

Q. And you're aware these are some FDA meeting background materials that were provided by Sandoz and Momenta to the FDA?

A. That's my understanding.

Q. If we look at table six, the column process 1.1.0 amino acid composition. Do you see that column?

A. Yes, I see it.

Q. And have you analyzed whether these numbers are in a ratio of approximately 6:2:5:1 for this batch lot 051M7282?

A. Yes, I have.

Q. Could we have the next slide, please? And if you could just first read into the record what the reported mole fraction is for lot 051M7282 in the FDA meeting background materials?

A. Yes. For alanine it's .427, for glutamic acid it's .136, for lysine it's .344 and for tyrosine it's 0.93 -- sorry, 0.093.

Q. Thank you, sir. And would a person of ordinary skill in the art consider the mole fraction for this lot to be approximately the same as the mole fraction of 6:2:5:1?

A. Yes, I believe so.

Q. If A person of ordinary skill in the art wanted to compare the molar ratio of this lot on the same scale as 6:2:5:1, what would they do?

A. Well, exactly as before, we would multiply by the factor of

14, since this is already on unity and that would give us four numbers that we could compare with the values in the '808 patent and they turn out to be 5.98 compared to 6, 1.90 compared to 2 and so on.

Q. And, sir, in your opinion, is the molar ratio of Sandoz' new lot 051M7282 at a molar ratio of approximately 6:2:5:1?

A. Yes.

Q. And very quickly, have you created another stack chart to visually illustrate this?

A. Yes.

Q. Could we have the next slide, please?

A. I've simply done the same thing here. I've expressed the data on a scale of unity or 1. I've used a blowout to show they can be compared that way, but it's less informative than if we compared them on the larger stack lot scale, scale of 14, but all of these give the same information.

Q. If we could actually go back to the prior slide for a minute, Mr. Chase. I just want to ask a couple of questions about the numbers on this slide, Dr. Gokel. Looking at the bottom right-hand corner, on a scale of 14, you have 1.30 for tyrosine and then 1 for the molar ratio of approximately 6:2:5:1. Do you see that?

A. Yes, I do.

Q. Would a person of ordinary skill in the art just compare the 1 to the 1.30 in doing an analysis of whether the molar

ratios were approximately the same?
A. No, a person of skill in the art would understand that these numbers are significant figures, that have rounding ranges and would say this is rounded to five -- sorry, to one significant figure, this 5.98 rounds to 6, so 6 compares to 6, 2 compares to 2, 5 compares to 5 and 1 compares to 1. In significant figures they're identical.
Q. And in the overall mixture of this lot, what's the difference in tyrosine between lot 051M7282 and exactly 6:2:5:1?
A. Well, the number exactly 6:2:5:1 for tyrosine calculates on a mole fraction scale of 0.7, here it's 0.9. So there's 2 percent difference between them or we can say they vary, 8 percent minus one percent. You could express it however you want. Those are the actual numbers.
Q. Thank you, sir. I want to turn away from molar fractions now and talk about one other limitation, that's predetermined by test reaction. Are you familiar with that limitation?
A. Yes, I am.
Q. Could we have slide 98? Slide 98 has the Court's construction which is determined beforehand by a reaction carried out to determine results of varying reaction conditions. Have you analyzed and applied this construction to Sandoz' and Mylan's proposed processes?
A. Yes, I have.

Q. And do you have an opinion whether Sandoz and Mylan's proposed synthetic processes contain a time and temperature predetermined by a test reaction?
A. Yes, I have, I believe they both do.
Q. Let's turn to Sandoz first if we could have the next slide. We just put up here a representative claim. And your Honor, just to be clear for the record, only some of the claims that are asserted in this case contain this limitation, I think it's eight of the claims, but we'll run through it. And, Dr. Gokel, if you could just read into the record what we've taken, what we've highlighted from claim 1 of PTX, 3 which is the '898 patent, so we have the context for this limitation.
A. Said reaction takes place for a time and at a temperature predetermined by test reaction.
Q. And the reaction that's being referred to here is the HBr acetic acid step that results in debenzylation and cleavage or depolymerization, is that correct?
A. Yes, that's correct.
Q. I want to start first with Sandoz' original ANDA. If you could turn to PTX 214.
A. I'm there.
Q. I want to talk -- first off, do you recognize this document, sir?
MR. WIESEN: I believe this is another -- sorry, your Honor, this is another document that has a redacted version.

You should have the full version in your binder, your Honor. I think the witness has the redacted version.

A. I do.

Q. Did you review the full version of PTX 214 in rendering your opinions in this case?

A. Yes, I did.

MR. WIESEN: Plaintiffs offer PTX 214 into evidence, your Honor.

MR. DOYLE: No objection.

THE COURT: Admitted.

(Plaintiff's Exhibit PTX 214 received in evidence)

Q. Then if you could turn, sir, to page SDZ186. If we could pull out the first full paragraph. I have this paragraph up on the screen as well, Dr. Gokel.

A. Yes, I see it.

Q. If you could just read this paragraph into the record, please.

A. If the time for depolymerization is insufficient or prolonged, the molecular weight of the polymeric mixture may not meet the label claim of 5,000 to 9,000 daltons. As a result, a large scale profile or engineering run was performed during which samples were taken at different time-points. These step 2 time-point aliquots were transferred to glatiramer acetate to allow for a more accurate assessment of the time of depolymerization at the larger scale. This knowledge was then

applied to the production batches.
Q. What is your understanding of what this paragraph describes, sir?
A. When a chemist is faced with a challenge of doing a reaction, he or she needs to know how long it will take and what will be the effect of it. So people do small scale or test reactions at different times, temperatures, concentrations and so on, to get an understanding of the overall reaction profile. Once they determine what the appropriate conditions are, then they follow those.
Q. And does this paragraph indicate that Sandoz and Momenta experimented with various times and temperatures for the step 2 depolymerization deprotection step?
A. Yes, this indicates they had an understanding of that and that they were performing these reactions.
Q. Based on this description, do you have an opinion whether the Sandoz original ANDA process had a time and temperature predetermined by test reaction as construed by the Court?
A. Yes, the time and temperature were understood or determined by these reactions. It would be the time and temperature that successfully led to the product they wished.
Q. And would these reactions be test reactions as the Court construed the term?
A. Yes, they would.
Q. Thank you, sir. I want to turn back, then, to the FDA

meeting background materials, PTX 913.
A. I have it.
Q. First I want to turn to page 36.
A. I'm sorry?
Q. 36. And again, we can pull it up on the screen as well. On page 36, do you see Section 3.3.3, modifications to step 2, depolymerization deprotection?
A. Yes, I see it.
Q. And there's another synthetic process diagram, do you see that?
A. Yes, I do.
Q. In your opinion, is that substantially similar to the process we ran through earlier?
A. Yes, it is.
Q. And just to set the context, this is the step in which the HBr acetic acid is used for the deprotection and depolymerization, is that right?
A. That's correct.
Q. If you turn to page 38 of the FDA meeting background material? The number for the section gets a little longer, 3.3.3.3. Do you see that?
A. Yes, I do.
Q. Generally, sir, what does this section describe?
A. This is a description of a methodology in which viscosity measurement is going to be used to determine when to stop the

reaction.
Q. And when you refer to the reaction, which reaction are you talking about?
A. This is the reaction in which the diprotected peptides are deprotected at glutamic acid and cleaved or depolymerized. It's the treatment with HBr treated acid.
Q. What is viscosity sir?
A. Viscocity is a property of a solution. It is roughly its fluidity and you could think about a nonviscous solution being something like gasoline and you could think of a viscous solution as honey.
Q. Have you looked at some documents concerning how Momenta and Sandoz developed this viscosity test?
A. Yes, I have.
Q. Turn to PTX 914 in your binder.
A. I have it.
Q. What is this document, sir? Could we have the first page, please?
A. The title at the top of the page is -- oh, I'm sorry. I went to the 951 page. The title is the same, though. The title for page 949 is glatiramer acetate viscosity IPC end point determination for step 2 depolymerization and I understand IPC to be their abbreviation for in process control.
Q. Did you analyze this document in rendering your opinions in this case?

A. I did.

MR. WIESEN: Plaintiffs offer PTX 914 into evidence, your Honor.

THE COURT: Any objection, Mr. Doyle?

MR. DOYLE: Just, your Honor, not to the document. This is one oversight, I believe, with regard to redaction that's on page 160953.

THE COURT: Is that going to be the subject of a slide?

MR. WIESEN: It was something we had intended to put up. In the redacted documents that were provided by Sandoz Momenta, I don't believe they redacted this page.

MR. DOYLE: This was, we redacted --

THE COURT: Is it coming up? Do you want to confer on it now?

MR. WIESEN: It's coming up momentarily, so I think it makes sense to confer now if we could have a moment.

THE COURT: Why don't you do that?

MR. DOYLE: Thank you, your Honor.

(Pause)

MS. BLOODWORTH: Your Honor, while we're waiting could we address one housekeeping issue?

THE COURT: Okay. Looks like there are plenty of other lawyers who are not engaged.

MS. BLOODWORTH: I believe Mr. Wiesen moved in PTX

294. It's actually PTX 294R, it's a redacted version of PTX 294.

THE COURT: Any document that's the redacted version, the only thing that will be made public will be the redacted version.

MS. BLOODWORTH: Thank you, your Honor.

THE COURT: Are we all set?

MR. WIESEN: We are all set. When we get to that page we'll shift from the public screen to the private screen, so just you and counsel will be able to see the particular page that Mr. --

MR. DOYLE: Yes, and we appreciate counsel's accommodation on this, and we'll submit a new redacted copy for the public record, your Honor. Apologize for the oversight.

THE COURT: All right. And I expect you'll make sure this happens, counsel. What document is it, again, or what page?

MR. WIESEN: PTX914. The page that I think raises the concern is 1630952.

MR. DOYLE: And also 955 I believe may have the same concern. I don't know whether you're going to use that one or not.

MR. WIESEN: We apologize.

THE COURT: They'll just be on the private screens. All right, thank you, go ahead.

MR. WIESEN: And, your Honor, I assume with that the document is admitted into evidence.

THE COURT: Yes it's admitted.

MR. DOYLE: No objection.

(Plaintiff's Exhibit PTX 914 received in evidence)

THE COURT: Go ahead.

Q. Does this report, Dr. Gokel, set forth the ways in which Sandoz now monitors a step 2 depolymerization reaction?

A. Yes, it does.

Q. If you could turn to page 1630951, Section 4.

A. Yes, I have it.

Q. What's described here?

A. It is the methodology for conducting the step 2 reaction, that is to say, that is to say the cleavage and deprotection step and it's going to use viscosity, which they describe as a macroscopic parameter to monitor the progress of the reaction.

Q. If we could look two sentences from the end. How does Sandoz indicate it's going to determine the end point of this reaction with this monitoring method?

A. The sentence states: The end point is defined as the viscosity at the specified temperature correlating to glatiramer acetate drug substance with a molar mass MP of approximately 7300 daltons by SEC MALS analysis (TP300) Molar mass is defined as MP, which is the average molar mass at the peak of the SEC distribution.

Q. Has Sandoz and Momenta studied whether there's a relationship between the time of the reaction and the viscosity?
A. Yes, they have.
Q. What have they concluded?
A. They have concluded that the reaction mixture that ultimately will lead to the appropriate molecular weight after additional steps has a certain viscosity that they can tabulate at different temperatures, so there is a correspondence between the temperature at which the reaction is conducted, the viscosity that is observed at the time the molecular weight is reached and after additional reactions, then the final product will be obtained with the appropriate molecular weight if the reaction is stopped at that time corresponding to that viscosity. Was that clear?
Q. Maybe we'll look at the tables in a minute and see if we can show that. Could we keep that up? One more question before we move on. Does this indicate whether under this process Sandoz and Momenta would have a predetermined molecular weight profile, a target weight that they're aiming for?
A. Yes.
Q. What would that target weight be?
A. Well, they specify here that they want to reach 7300 daltons.
Q. If we could go to the private monitors, Mr. Chase. If we

could turn to 1630953, table 1. What does table 19 in this report show and if you could, Dr. Gokel, try and avoid using the particular numbers and describe things in a more general way.

A. Okay.

THE COURT: Good luck, Doctor.

THE WITNESS: Thank you.

A. This is a table that has two columns. It's okay to say that, right?

Q. It is okay to say that?

A. It has two columns. The first column is titled batch temperatures and it is a range of temperatures, it is a range of temperatures in two tenths of a degree increments, and in the second column, there is a list of viscosities, the abbreviation for which is centipoise, and that's abbreviated CP and each of the temperatures in these two tenths of a degree increment is then correlated with a range of viscosity values, and the idea here is that if the reaction were being run at temperature X, the reaction would be run until viscosity Y in column B was observed and at that time the reaction would be stopped because they know that at that time they have a product that ultimately can be converted into the desired 7300 dalton material.

Q. And if we look back at page 1630952, the bottom part under viscosity end point determination?

A. 30952, yes, I have it.
Q. Under 5.0, methods, under viscosity end point determination, do you see that?
A. Yes.
Q. And does that provide the general description you've just given?
A. Yes. Am I allowed to read this? Do you want me to read it? I don't know what to do.
Q. I think the exhibit is in the record, so we can just leave it at that.
A. Okay.
MR. DOYLE: If I could just -- excuse me. I don't want to interrupt the witness.
THE WITNESS: You can interrupt. I don't know what to do.
MR. DOYLE: If counsel is going to refer and put 954 up, which is a graph, would you put that on the private screen too, please?
THE COURT: I think at the moment we're just reading this one section and that's okay, right?
MR. DOYLE: Yes, your Honor.
THE COURT: Okay. Go ahead, Doctor.
A. So may I read it out loud?
Q. Could you read this paragraph into the record, please?
A. Yes. It says viscosity -- oh, viscosity end point

determination. The depolymerization viscosity will decrease over time and will fluctuate with temperature changes.

One, monitor the reaction viscosity and batch temperature from the viscometer. Two, when the batch reaches the viscometer in column B, see table 1 at the corresponding batch temperature in column A, the batch is ready to quench into water. Promptly begin transferring the depolymerization solution into water.

Q. And does this indicate to you that Sandoz Momenta determined, as we saw in detail in table 1, a relationship between time and viscosity and then used that to determine the end point for step 2?

A. Yes. The table tells the -- the table shows the temperature and the viscosity, but the viscosity corresponds to a time when the reaction should stop because that is the viscosity of the solution that will ultimately lead to the desired molecular weight product.

Q. Thank you, Dr. Gokel. Is this the only model that Sandoz and Momenta discuss in this report?

A. No, it is not.

Q. Is there a backup model as well?

A. Yes, there's a backup model.

Q. And if you turn to 1630954, and if we could put that I guess on the private monitors, Mr. Chase? Does this page describe the backup process?

A. Yes, it does.
Q. And if we could highlight -- Mr. Doyle, is it okay to read the text into the record?
MR. DOYLE: The text is fine, if we could just have, this is on the private screen now. Yes. The text is fine.
Q. Does the first paragraph on this page, sir, indicate that this is the backup model that's going to be used?
A. Yes. Am I allowed to read text?
Q. You can read text, yes.
A. Yes, it says in the event of the viscometer equipment failure or the inability to obtain accurate viscosity readings, the reaction end point may be determined using the alternative method described below.
Q. What is the alternative method that's described?
A. It is simply the time and temperature relationship for the reaction of HBr acetic acid that will depolymerize and deprotect the first protected intermediate.
Q. And if we turn to table 2 on the private screen on 1630955, what's generally described in this table? The next page, please, Mr. Chase, the table, not the graph. Thank you.
A. This table is the complement of the one that we looked at a moment ago. In the left hand column, again, is a column of temperatures, I won't specify the range, but they are the same temperatures as before, and they are in increments of two tenths of a degree as before. This time instead of being

paired with the viscosities, they are being paired with the number of hours that would indicate the end point of the step 2 reaction.

Q. Dr. Gokel, in your opinion if Sandoz used the first process using the viscometer as described in this report, would they have a predetermined time and temperature as the Court has construed the terms?

A. Yes, they would.

Q. And if Sandoz used the second model with the time and temperature table, would Sandoz have a predetermined time and temperature as determined by the Court?

A. Yes, they would.

Q. And if Sandoz used the process that had the primary viscometer model and the backup time temperature model, would they have a predetermined time and temperature as construed by the Court?

A. Yes, they would.

Q. Have you looked at some documents about how Sandoz constructed these models?

A. Yes, I have.

Q. Did they use test reactions, sir, as the Court has construed the term?

A. Yes, they did.

Q. Could you turn to PTX 923 in your notebook? And there's a 923R for this as well, your Honor. I think we've got all the

redactions down on this one.

THE COURT: Okay.

Q. Do you recognize PTX 923, Dr. Gokel?

A. Yes, I do. It's a laboratory notebook from Momenta.

MR. WIESEN: Your Honor, plaintiffs offer PTX 923 into evidence.

MR. DOYLE: No objection, your Honor.

THE COURT: Admitted.

(Plaintiff's Exhibit PTX 923 received in evidence)

Q. If you could turn to MMP01694006. If you pull out the top part, it's still not going to be very legible, but -- and this is the redacted page. Dr. Gokel, could you just briefly describe what this page shows?

A. Yes. This is a notebook page that is a summary of a number of different reactions that were run. Reaction samples were taken at different times and different temperatures in order to create the viscosity profile that was shown in table A and of course, sorry, in table 1, and of course it also gives us the time numbers that are present in table 2.

Q. So although it's difficult to see if we look along the colored boxes on the left-hand side, do these represent experiments at different times and temperatures?

A. Yes, they do. The colored portion on the left sort of says what, and then time and the ultimate molecular weight are shown in the next two columns.

Q. And without getting into the details, do these represent in your opinion the test reaction that Sandoz and Momenta ran to build the models we just looked at?

A. Yes, I believe that's what they are.

Q. And if you could turn just to one other page, 1691407 in this notebook.

A. 1694107?

Q. Yes, sir.

A. I have it.

(Continued next page)

BY MR. WIESEN:

Q. Yes, sir.

A. I have it.

Q. And does this table simply show using the data on the prior page to generate the models using a computer program?

A. That's my understanding.

Q. Sir, based on your analysis of Sandoz's and Momenta's documents, have they used test reactions to predetermine the time and temperature of the step-two depolymerization step?

A. Yes, they have.

Q. Thank you. I want to turn very quickly to whether Mylan has time and temperature predetermined by test reaction.

MS. BLOODWORTH: Your Honor, if I may interrupt just one moment. I think we might be served by a five minute break for reason to talk about some of the confidentiality issues that we think is a lot easier to Dr. Gokel, if we do.

THE COURT: Okay. Five minutes.

MR. WIESEN: Thank you, your Honor.

(Recess)

(Pages 440 to 443 are filed under seal by order of the Court)

(In open court)

THE LAW CLERK: All rise

THE COURT: Please be seated.

Go ahead, Mr. Wiesen.

MR. WIESEN: Thank you, your Honor.

Q. Turning to Mylan's process, Dr. Gokel, do you have an opinion as to whether Mylan's proposed process in their ANDA would meet the predetermined, the time and temperature predetermined by a test reaction limitation?

A. Yes, I do.

Q. What is your opinion, sir?

A. I believe that it does.

Q. If you could turn to PTX-321 in your binder.

MR. WIESEN: And, your Honor, it may make sense to just leave these pages on the private screens in case the particular details are contained somewhere within a list of numbers.

THE COURT: That's fine.

Q. Do you recognize this document as a portion of Mylan's ANDA that you reviewed, sir?

A. Yes, I do.

MR. WIESEN: And there is, there will be, if there is not yet, an redacted version of the document as well, your Honor.

THE COURT: Okay.

MR. WIESEN: We'd offer PTX-321 in evidence.

MR. ANSTAETT: No objection, your Honor.

THE COURT: All right, admitted.

(Plaintiff's Exhibit PTX-321 received in evidence)

Q. If you could turn, sir, to page MYL-645.

A. Yes, I have it.

Q. And if you could read into the record the title of this page?

A. The title of the page?

Q. Of the -- highlight that title lower down.

If you could just read the first title into the record, please?

A. Yes. The title is "Effect of debenzylation reaction time and temperature on the molecular weight."

Q. And do you have an understanding, sir, what's described on pages MYL-645, 646 and 647?

A. Yes. For any given chemical reaction -- and this one refers to the debenzylation and depolymerization step with HBr acetic acid, for any given chemical reaction, one needs to know how long it takes at a particular temperature to get the desired result. And so these are studies to determine that.

Q. And if we look at the method section on MYL-645, what attribute is being altered in this experiment?

A. On the third line at the very end it specifies a particular time and hours. Can I say that time or --

Q. Don't.
A. Okay, particular.
Q. Avoid saying the actual times and temperatures, please.
A. Okay, I understand. Particular time.
And the reaction was then conducted at a variety of temperatures over a certain range that's specified here, and then the products were obtained and analyzed.
And from that information, they know how long to -- they know at what temperature to run the reaction if they're going to run it for 17 hours.
Q. And if you turn to MYL-648, sir?
A. Yes, I have it.
Q. What is the experiment described here, generally?
A. This is the debenzylation reaction time on the molecular weight.
Q. And if we look at the third line under method, what attribute is being altered or experimented with?
A. Yes. This is, this is the same kind of information that we saw before, except here the time is held constant and the number of hours is varied, because --
Q. And, sir, you said the time is held constant and the number of hours is varied. Is that what you meant?
A. H'mm. No. Sorry. The temperature is held constant at a particular value, and then the time is varied because the success of a reaction has as variables both time and

temperature.

Q. And do you have an understanding, sir, whether Mylan used, Mylan and Natco used these experiments to set the time and temperature for their step-two debenzylation deprotection reaction?

A. That's my understanding, yes.

Q. And based on these experiments, do you have an opinion whether their time and temperature are predetermined by test reaction?

A. Yes, based on these experiments, they have determined both time and temperature.

MR. WIESEN: And, your Honor, we can point out later in which document the particular time and temperature are stated. It's actually PTX-321, on MYL-262, but we'll, subject to the stipulation, we don't need to ask Dr. Gokel any questions concerning that.

THE COURT: All right. Fine.

Q. Thank you, Dr. Gokel. Just one other set of questions, I believe.

I want to focus for a minute now on the limitations of the claims in the patents-in-suit.

Dr. Gokel, you were in attendance at trial when Dr. Lisak and Grant testified earlier this week, is that right?

A. I was.

Q. And you have an understanding as to which claims of the

patents-in-suit plaintiffs are asserting against the Sandoz and Mylan defendants?

A. Yes, I do.

Q. Based on your analysis and hearing the other testimony in the case, have you formed opinions as to whether Sandoz's proposed generic product and the process for making it meet the limitations of the asserted claims of the patents-in-suit?

A. Yes, I have formed such a conclusion.

Q. And what are your opinions, sir?

A. I believe the limitations of the asserted claims are met.

Q. And have you formed opinions as to whether Mylan and Natco's proposed generic glatiramer acetate and the process for making it meet the limitations of the asserted claims in the patents-in-suit?

A. Yes, I believe it does.

Q. Thank you. If we can have slide 101, please.

Dr. Gokel, we've put up on the screen the limitations from U.S. patent number 5,800,808. I want to ask your opinions and the basis for the various limitations on whether they're met.

Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA products and ANDAs meet the limitations of method of manufacturing co-polymer-1 comprising reacted protected copolymer-1, with hydrobromic acid to form trifluoracetyl co-polymer-1, treating said trifluoracetyl

co-polymer-1 with aqueous piperidine solution to form co-polymer-1, and purifying said co-polymer-1?

A. Yes.

Q. And what's the basis for that opinion, sir?

A. The basis is all of the discussion that I've just been through yesterday afternoon and today in my direct testimony.

Q. And do you also have an opinion, sir, whether the resulting product would be to result in copolymer-1 having a molecular weight of about five to nine kilodaltons?

A. Yes. Dr. Grant so testified.

Q. And based on that, sir, do you have an opinion whether Sandoz and Momenta's proposed ANDA products and ANDAs would infringe claim one of the 5,800,808 patent?

A. Yes, I believe it would.

Q. Do you have next slide please? Turning then to U.S. patent number 5,981,589, do you have an opinion whether Sandoz and Momenta's ANDAs and proposed products would meet the limitation of co-polymer-1 having a molecular weight of about five to nine kilodaltons?

A. Based on Dr. Grant's testimony, yes.

Q. And do you have an opinion, sir, whether that co-polymer-1 is made by a process comprising systems of reacting protected co-polymer-1 with hydrobromic acid to form trifluoracetyl co-polymer-1, treating said trifluoracetyl co-polymer-1 with aqueous piperidine solution to form co-polymer-1, and purifying

said co-polymer-1 to result in co-polymer-1?
A. Yes, I do.
Q. And what's the basis for those opinions, sir?
A. I've been through each of those steps, and I believe them to infringe.
Q. And do you have an opinion whether, after those limitations, the resulting product would be having a molecular weight of about five to nine kilodaltons?
A. Yes. Based on Dr. Grant's testimony, I believe so.
Q. Do you have an opinion, sir, then whether Sandoz and Momenta and Mylan and Natco proposed ANDA and ANDA products would infringe claim one of the '589 patent?
A. Yes, I believe it would -- they would.
Q. The next slide, please. Turning to U.S. patent number 6,048,898, do you have an opinion whether Sandoz and Momenta proposed ANDAs and proposed ANDA products would meet the limitation of methods of manufacturing co-polymer-1 of a predetermined molecular weight profile comprising the steps of selecting a predetermined molecular weight profile, reacting protected co-polymer-1 with hydrobromic acid to form trifluoracetyl co-polymer-1, having the predetermined molecular weight profile, wherein said reaction takes place for a time and at a temperature predetermined by test reaction, and treating said trifluoracetyl co-polymer-1 having the predetermined molecular weight profile with aqueous piperidine

solution to form co-polymer-1, having the predetermined molecular weight profile?

A. Yes.

Q. What's your opinion, sir?

A. My opinion is that both Sandoz and Mylan meet that claim limitation.

Q. And, sir, just to make sure the record is clear, I may have misspoken and said Sandoz Momenta and Sandoz and Mylan sometimes. Do you have an opinion whether both ANDAs meet the claim limitations and asserted claims we've reviewed so far?

A. Yes, I do.

Q. And what's your opinion?

A. My opinion is that Sandoz and Mylan both meet those limitations.

Q. Thank you. If we go to claim two of the '898 patent. Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDAs and ANDA products meet the limitation of the method of claim one, wherein said protected co-polymer-1 is reacted with hydrobromic acid for about ten to 50 hours at a temperature of about 20 to 28 degrees Celsius?

A. Yes.

Q. And what's the basis for that, sir?

A. I went through the reaction sequences and it showed this.

Q. And looking at claim three of the '898 patent focusing only on Mylan's ANDA and not on Sandoz's ANDA, do you have an

opinion whether the method of claim two, wherein said protected co-polymer-1 is reacted with hydrobromic acid for about 17 hours at a temperature of about 26 degrees Celsius, is that by Mylan's proposed ANDA and ANDA product?

A. Yes, I do.

Q. And what is your opinion, sir?

A. My opinion is that it meets this limitation, although we didn't actually say the numbers.

MR. WIESEN: And, your Honor, just to be clear, the last one is actually now met by the stipulation that was entered.

THE COURT: All right.

Q. If we go to the next slide, please, U.S. patent number 6,054,430. Dr. Gokel, do you have an opinion whether the asserted claims in these patents are met by Sandoz and Mylan's ANDAs?

A. Yes, I do.

Q. Do you have an opinion, sir, or what's your opinion, sir, concerning whether Sandoz and Mylan's ANDAs meet the limitation co-polymer-1 having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?

A. My opinion is that both Sandoz and Mylan infringed, based on Dr. Grant's testimony.

Q. Do you have an opinion, sir, whether that co-polymer-1 is

prepared by a process comprising the steps of reactive protected co-polymer-1 with hydrobromic acid to form trifluoracetyl co-polymer-1, having over -- I'll stop there for the moment. Do you have an opinion concerning those limitations, sir?

A. Yes. That's the reaction sequence.

Q. And is that based on your analysis?

A. That's based on my analysis of their documents.

Q. And would that co-polymer-1 be one having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?

A. According to Dr. Grant's testimony, yes.

Q. And would it be one, wherein said reaction takes place for a time at a temperature predetermined by test reaction and treating said trifluoracetyl co-polymer-1?

A. Yes, it would.

Q. Do you have an opinion that those are Mylan and -- Mylan and Sandoz ANDAs meet those limitations based on what, sir?

A. My opinion that those claim limitations are met by the ANDA product is based on my analysis of their synthetic sequences.

Q. Do you have an opinion whether those products would be having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?

A. Based on Dr. Grant's testimony, yes.

Q. And do you, finally, have an opinion on claim one, sir, whether that process would be with aqueous piperidine solution to form co-polymer-1?
A. Yes, both Sandoz and Mylan use aqueous piperidine in that step.
Q. And would the resulting product be one having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?
A. According to Dr. Grant's testimony, yes.
Q. And, sir, finally, then do you have an opinion whether claim one of the 430 would be infringed by Sandoz and Mylan's proposed ANDA products and ANDAs?
A. Yes, I do.
Q. And what's your opinion?
A. My opinion is that both infringe.
Q. Turn to claim two of the '430 patent. Do you have an opinion, sir, whether the co-polymer-1 of claim one, wherein said protected copolymer-1 also reacted with hydrobromic acid for about ten to 50 hours at a temperature of about 20 to 28 degrees Celsius is met by Sandoz and Mylan's proposed ANDA and ANDA products?
A. Yes, I do. And that's based on my analysis of the synthetic documents.
Q. And focusing on claim three, in looking only at Mylan's ANDA, do you have an opinion whether it meets the limitation

copolymer-1 of claim one, wherein said protected copolymer-1 is reacted with hydrobromic acid for about 17 hours at a temperature of about 26 degrees Celsius?

A. Yes, I do.

Q. And what's your opinion?

A. I believe that claim limitation is met by Mylan.

Q. And, sir, do you have an opinion, sir, whether Mylan's proposed ANDA meets asserted claims one, two and three of the '430 patent?

A. Yes, I do. I believe they do.

Q. And do you have an opinion whether Sandoz's proposed ANDA meets claims one and two of the '430 patent?

A. Yes, I believe they do.

Q. Go to the next slide. Another long claim.

Look at claim one of 6,342,476. Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA and ANDA products would meet the limitation, a method for treating Multiple sclerosis, comprising administering to a subject in need thereof, pharmaceutically effective amount?

A. According to Dr. Lisak's testimony, yes.

Q. And would those limitation be met?

A. Yes, they would.

Q. Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA and ANDA products would meet the limitation of a copolymer-1 fraction, wherein said fraction contains less than

5 percent of species of copolymer-1 having a molecular weight of over 40 kilodaltons, and wherein over 75 percent of said copolymer-1 in said fraction is within a molecular weight range of about two kilodaltons to about 20 kilodaltons?

A. Yes, I do.

Q. What's your basis -- what is your opinion, sir?

A. My opinion is that this limitation is met. The copolymer fraction is certainly there, and according to Dr. Grant's testimony, it is distributed in the molecular weight as indicated here.

Q. And that's for both ANDAs?

A. Yes, it is.

Q. Thank you. Do you have an opinion, sir, whether the limitations were in said copolymer-1 fractions prepared by a process comprising the steps of reacting protected copolymer-1 with hydrobromic acid to form trifluoracetyl copolymer-1 are met?

A. Yes, I do.

Q. And what is your opinion, sir?

A. I believe those limitations are met.

Q. And what is that based on?

A. That's based on my analysis of their synthetic documents.

Q. And do you have an opinion whether Sandoz and Mylan's proposed ANDAs meet the limitation having over 75 percent of its molar fraction within the molecular weight range from about

two kilodaltons to about 20 kilodaltons?
A. According to, and based on Dr. Grant's testimony, yes.
Q. Do you have an opinion, sir, whether the limitations wherein said reaction takes place for a time and at a temperature predetermined by test reaction and treating said trifluoracetyl co-polymer-1 are met by Sandoz and Mylan's ANDA and ANDA products?
A. Yes, I believe they're met, and I showed examples in the synthetic testimony that I gave.
Q. And do you believe the limitation having over 75 percent of it molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons is met, sir?
A. Based on Dr. Grant's testimony, I do.
Q. And what is your opinion?
A. My opinion is that that claim limitation is met.
Q. Do you an opinion whether the limitation with aqueous piperidine solution to form copolymer-1 is met?
A. Yes, I do. Both Sandoz and Mylan use aqueous piperidine.
Q. And finally on claim one of the '466, do you have an opinion whether Mylan and Sandoz's proposed ANDA products would meet the limitation having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?
A. Yes. According to Dr. Grant's testimony, I believe this claim limitation is met.

Q. Based on this analysis, sir, do you have an opinion whether Sandoz and Mylan's proposed ANDA and ANDA products meet claim one of the '476 patent?
A. Yes, I believe they do.
Q. Go to the next slide, please. Looking at claim one of U.S. patent number 6,362,161, sir. Do you have an opinion whether Sandoz and Mylan's proposed ANDAs meet the following limitations, composition for the treatment of must multiple sclerosis, comprising a pharmaceutically effective amount?
A. According to Dr. Lisak's testimony, they do.
Q. Do you have an opinion, sir, whether they meet the limitation of co-polymer-1 fraction, wherein said fraction contains less than 5 percent of species of copolymer-1 having a molecular weight of over 40 kilodaltons, and wherein over 75 percent of said co-polymer-1 in said fraction is within a molecular weight range of about two kilodaltons to about 20 kilodaltons?
A. Yes, I do.
Q. What is your opinion, sir?
A. That they have a co-polymer-1 fraction I demonstrated in my synthetic discussion, and the molecular weight information is based on Dr. Grant's testimony.
Q. Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA and ANDA products meet limitations wherein said co-polymer-1 fraction is prepared by a process comprising the

steps of reacting protected copolymer-1 with hydrobromic acid to form trifluoracetyl co-polymer-1?

A. Yes, I do.

Q. What is?

A. I showed experiment sequences that demonstrated that.

Q. Do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA and ANDA products meet the limitation having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?

A. Based on Dr. Grant's testimony, I believe that limitation is met.

Q. And do you have an opinion, sir, whether Sandoz and Mylan's proposed ANDA and ANDA products meet the limitation wherein said reaction takes place for a time and at a temperature predetermined by test reaction and treating said trifluoracetyl copolymer-1?

A. Yes. I just discussed the time and temperature predetermination a few minutes ago.

Q. And do you have an opinion that those limitations are met by Sandoz and Mylan's ANDA and ANDA products?

A. Yes, I do. And my opinion is that they are met.

Q. Do you have an opinion whether the limitation having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons is met?

A. According to Dr. Grant's testimony, yes.
Q. And do you have an opinion, sir, whether limitation with aqueous piperidine solution to form copolymer-1 is met?
A. Yes. I showed that both Sandoz and Mylan approaches use aqueous piperidine in their deprotection step.
Q. Finally, I think the last limitation is actually the same as the 12 lines from there.

Do you have an opinion about whether Sandoz and Mylan's proposed ANDA and ANDA products meet the limitation having over 75 percent of its molar fraction within the molecular weight range from about two kilodaltons to about 20 kilodaltons?
A. According to Dr. Grant's testimony, yes.
Q. And, sir, based on this analysis, do you have an opinion whether claim one of the 161 patent is met by Sandoz and Mylan's proposed ANDA and ANDA products?
A. Yes. My opinion is that the limitations of claim one are met by both Sandoz and Mylan.
Q. Go to the next slide, please. Turning to the '847 patent, sir. Looking at claim one. Do you have an opinion whether Sandoz and Mylan's proposed ANDA and ANDA products meet the limitation copolymer-1 having a molecular weight of about four to about nine kilodaltons?
A. According to Dr. Grant's testimony, yes.
Q. So those limitations are met, sir?

A. Yes, I believe those limitations are met according to Dr. Grant's testimony.
Q. Are the limitations made by a process comprising treating trifluoracetyl copolymer-1 with aqueous piperidine to form a solution of copolymer-1 and purifying copolymer-1, thereby producing copolymer-1, met by Mylan and Sandoz proposed ANDA and ANDA products?
A. Yes. I went through both of their sequences and showed that those limitations are met by both Sandoz and Mylan.
Q. And is the limitation in claim one of the '847 having a molecular weight of about four to about nine kilodaltons met by Sandoz and Mylan's proposed ANDA and ANDA products?
A. According to the testimony of Dr. Grant, that limitation is met by both Sandoz and Mylan.
Q. Turn to claim six of the '847, do you have an opinion whether limitations of this claim are met?
A. Yes, I do.
Q. What is your opinion?
A. My opinion is that the claim limitations are met.
Q. Turning specifically to the claim. Do you have an opinion, sir, whether Mylan and ANDA -- Mylan and Sandoz proposed ANDA and ANDA products meet the limitations copolymer-1 made by the process of claim one, wherein the process further comprises adding acetic acid subsequent to the treating step?
A. Yes, I believe that claim limitation is met by both, and we

showed portions of their batch records indicating the use of acetic acid in each case.

Q. Based on this analysis, sir, do you have an opinion whether claims one and six of the '847 patent are infringed by Sandoz and Mylan's proposed ANDA and ANDA products?

A. Yes, I do. I believe all of the limitations are met for both claims by both defendants.

Q. Turning to U.S. patent number 6,939,539. Do you have an opinion whether the asserted claims of these patents are met sir?

A. Yes, I do.

Q. What is your opinion?

A. My opinion is that these claims are met by both Sandoz, these claim limitations are met by both Sandoz and Mylan.

Q. And turning specifically to the limitations of the '539 patent, claim one. Do you have an opinion whether Sandoz and Mylan's ANDA and ANDA products would meet the limitations copolymer-1 composition comprising a mixture of polypeptides, composed of glutamic acid, lysine, alanine and tyrosine?

A. Yes, I do.

Q. What is your opinion?

A. I believe that the product, the co-polymer-1 composition and in both cases Sandoz and Mylan meets this claim limitation of having those four amino acids.

Q. Do you have an opinion or, sorry, let me start again. Do

you have an opinion whether the limitation wherein the mixture has an average molecular weight of about four to about nine kilodaltons is met, sir?

A. I do. According to Grant's, to Dr. Grant's testimony, it is, by both defendants.

Q. Do you have an opinion, sir, whether the limitation wherein the mixture of polypeptides is non-uniform with respect to molecular weight and sequence, is met by Mylan and Sandoz's proposed ANDA and ANDA products?

A. Yes, I believe that limitation is met as I demonstrated in the synthetic sequences.

Q. Finally, for claim one, do you have an opinion whether the limitation and wherein the composition is suitable for treating Multiple sclerosis is met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. According to Dr. Lisak's testimony, this limit is met by both Sandoz and Mylan.

Q. Turning to pendent claim eight of the '539 patent, do you have an opinion whether the composition of claim one -- whether this claim is met, sir?

A. Yes, I do.

Q. What's your opinion?

A. My opinion is that it is met by both defendants.

Q. Turning specifically to the limitation, the limitations of the composition of claim one, wherein less than 2.5 percent of

the polypeptides of the mixture on a molar fraction basis have a molecular weight of over 40 kilodaltons met by Mylan and Sandoz's proposed ANDA and ANDA products?

A. Yes. The composition is as described above, and that limitation is met. According to Dr. Grant's testimony, the molecular weight limitations are also met by both defendants.

Q. Turning to claim nine. Are the limitation, the composition of claim eight, wherein over 75 percent of the polypeptides of the mixture, on a molar fraction basis, have a molecular weight in a range of about two kilodaltons to about 20 kilodaltons, met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. Yes, the composition is as I described before, and according to Dr. Grant's testimony, this molecular weight limitation is met as well by both defendants.

Q. Turning to claim ten. Are the limitations, the composition of claim nine, wherein the mixture has an average molecular weight of 6.25 to 8.4 kilodaltons, in your opinion, met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. According to Dr. Grant's testimony, both claim limitations are met by both defendants.

Q. Turning to claim 12. Are the limitation pharmaceutical composition comprising of a dose therapeutically effective to treat Multiple sclerosis of a copolymer-1 composition, met by the Sandoz and Mylan ANDA and ANDA products?

A. It is a pharmaceutical composition. I suppose that's

agreed.

The therapeutically effective dose, I believe, is met, according to Dr. Lisak's testimony, and it is a copolymer-1 composition as I demonstrated by the synthetic sequences, so I believe all the limitations are met.

Q. If we actually turn to the next slide, we're going to continue with claim 12 of the '539 patent.

MR. WIESEN: We're almost done, your Honor.

Q. Are the limitations, wherein the copolymer-1 composition comprises a mixture of polypeptides, composed of glutamic acid, lysine, alanine and tyrosine, met by the proposed ANDA and ANDA products of Sandoz and Mylan?

A. Yes. The copolymer-1 composition I showed by the experimental documents is as defined here, and the limitations are therefore met by both Sandoz and Mylan.

Q. And is the limitation, wherein the mixture has an average molecular weight of about four to about nine kilodaltons, met by the proposed ANDA and ANDA products of Mylan and Sandoz?

A. According to Dr. Grant's testimony, it is.

Q. Finally on claim 12, are the limitations wherein the mixture of polypeptides is non-uniform with respect to molecular weight and sequence and a pharmaceutically acceptable recipient, met by the proposed ANDAs of Sandoz and Mylan?

A. Yes. The polypeptides being non-uniform with respect to molecular weight in sequence is something that I demonstrated

in the synthetic analyses, and both Sandoz and Mylan meet that limitation.

Q. Turning to claim 23 of the '539 patent. Is the limitation a method for treating a patient suffering from Multiple sclerosis comprising administering to a patient in need thereof the pharmaceutical composition of claim 12, met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. According to Dr. Lisak,'s testimony, it is for both of the defendants.

Q. Turning to claim 30, the limitation a method of treating a patient suffering from Multiple sclerosis comprising administering to a patient in need thereof, met by the proposed ANDA and ANDA products?

A. According to Dr. Lisak's testimony, both defendants meet that limitation.

Q. And the last limitations, the pharmaceutical composition of claim 19, and we've included that because claim 19 is not actually asserted, so let my read that into the record as well.

The pharmaceutical composition of claim 12, wherein less than 2.5 percent of the polypeptides of the mixture on a molar fraction basis have a molecular weight of over 40 kilodaltons, are those limitations met by the proposed ANDA and ANDA products of Mylan and Sandoz?

A. Yes. According to Dr. Grant's testimony, they are.

Q. Turning to claim 31. Are the limitations a method for

treating a patient suffering from Multiple sclerosis comprising administering to a patient in need thereof, met by the proposed ANDA and ANDA products of Sandoz and Mylan?

A. Yes. Dr. Lisak testified that those limitations were met by both defendants.

Q. Turning to the last limitation of claim 31, which is the pharmaceutical composition of claim 20, which we've also included, and it reads. The pharmaceutical composition of claim 19, wherein over 75 percent of the polypeptides of the mixture on a molar fraction basis have a molecular weight in a range of about two kilodaltons to about 20 kilodaltons, are those limitations melt, in your opinion, sir, by Sandoz and Mylan's proposed ANDA and ANDA products?

A. They are met by Sandoz and Mylan, according to Dr. Grant's testimony.

Q. Based on this analysis, sir, do you have an opinion whether the asserted claims of the '539 patent are met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. Yes. I believe the asserted claims of the '539 patent are met by both defendants.

Q. We have the next slide, please, and I believe this is the last asserted patent, 7,199,098.

Do you have an opinion, sir, whether Sandoz and Mylan proposed ANDAs meet the limitations copolymer-1 composition comprising a mixture of copolymers of alanine, glutamic acid,

lysine and tyrosine, the copolymer-1 species in the mixture being non-uniform with respect to molecular weight and sequence?

A. Yes, I described their synthetic documents, and that from those I conclude that those limitations are met by both defendants.

Q. Do you have an opinion, sir, whether the limitations wherein over 75 percent of the copolymers in the mixture on a molar fraction basis have a molecular weight in the range of two kilodaltons to 20 kilodaltons, and less than 5 percent of the copolymers have a molecular weight above 40 kilodaltons, is met?

A. According to Dr. Grant's testimony, both defendants meet this limitation.

Q. Finally, do you have an opinion whether the limitation, wherein the composition is suitable for treating Multiple sclerosis is met by Sandoz and Mylan's proposed ANDA and ANDA products?

A. According to Dr. Lisak's testimony, both defendants did meet this limitation.

Q. Turning to pendent claim eight of the '098 patent, do you have an opinion, sir, whether the limitations, the composition of claim one, wherein less than 2.5 percent of the copolymers in the mixture have a molecular weight above 40 kilodaltons?

A. Yes. I described the composition of claim one, and Dr.

Grant testified that the other claim limitation was met by both defendants.

Q. And so, sir, do you have an opinion whether claims one and eight of the '098 patent are infringed by Sandoz and Mylan's proposed ANDA and ANDA products?

A. Yes. It's my opinion that both claim one and claim eight of the '098 patent are infringed by both defendants.

MR. WIESEN: And, your Honor, originally we had asserted claim 19 of the '098 patent in the final pretrial order. We simply since identified to the defendants that we're no longer asserting that claim, so it's not included here.

THE COURT: Thank you.

Q. Thank you, Dr. Gokel.

MR. WIESEN: I have no further questions.

THE COURT: All right.

MR. JONES: May I approach, your Honor, to provide some documents?

THE COURT: Sure.

MR. JONES: Thank you.

CROSS EXAMINATION

BY MR. ANSTAETT:

MR. ANSTAETT: Your Honor, may I proceed?

THE COURT: Yes.

MR. ANSTAETT: Thank you.

Q. Good morning, Dr. Gokel.

A. Good morning.
Q. I want to try to orient you to all the information you have up there in front of you. You still have your direct examination binder, correct?
A. Yes, I do.
Q. And you've been given a cross-examination binder I believe as well. It's a bit smaller. You see that?
A. This one?
Q. Should have your name on it. It says cross-examination?
A. In says expert reports and deposition transcripts.
Q. That's correct. I've given you a binder with your expert reports from the Mylan case, as well as your deposition transcript from that case.
A. I seem to have everything.
Q. All right. And the last one is, you also have a copy of Dr. Kent's expert report, his second expert report. Do you see that?
A. I see it.
Q. All right. Doctor, please turn to PTX-499 in your cross-examination binder, please. And the PTX exhibits are in the back of the cross-examination binder, so that's P as in plaintiff.
A. Yes, I have it.
Q. All right. If you look at page two of the exhibit, please. And you've reviewed this article, haven't you, Doctor?

A. Yes.
Q. Mr. Wiesen talked about it with you in your direct examination?
A. Yes.
Q. And this is the 1971 article that was published by the Weizmann Institute Scientists first reported a discovery of copolymer-1, correct?
A. That's correct.
Q. All right, it's from 1971?
A. That's correct.
Q. And so if I call this the Teitelbaum 1971 article, you'll know what I'm talking about?
A. Yes.
Q. All right, I want you to look at table one, please.
A. Yes I see it.
Q. That table reports, the molar ratio of two batches of copolymer-1, correct?
A. Yes, it does.
Q. Could you read the molar ratios for each of those batches, please?
A. Yes. Batch one for the amino acids alanine, glutamic acid, lysine and tyrosine, respectively it's 6.0:1.9:4.7:1.0. And for batch two, the same amino acids in the same order, show the value 6.7:2.1:4.2:1.0.
Q. All right. So in batch one, for every 1.0 tyrosines, there

are 6.0 alanines, 1.9 glutamic acids, and 4.7 lysines; is that correct?

A. That's the proportion of them that's present.

Q. All right. And the ratios for both batch one and batch two there show a tyrosine content of 1.0, correct?

A. That's correct.

Q. Doctor, let me ask you to turn to DTX1335 in the cross-examination binder?

A. 13?

Q. 1335?

A. I have it.

(Continued on next page)

BY MR. ANSTAETT:

Q. All right. And you're familiar with the journal Nature?

A. Yes.

Q. That's a reputable journal in your field, correct?

A. It's a what?

Q. A reputable journal in your field, correct?

A. It's reputable, yes.

Q. Turn to the third page of the exhibit, I think it's 564 if you look at the page numbers?

A. I have 564.

Q. Do you see at the bottom entitled protection against EAE?

A. Yes. It's actually spelled out.

Q. Correct. And this is one of the articles that you reviewed in preparing your expert reports in this case, correct?

A. I believe so. If it's in my list of documents, I certainly did.

Q. Okay. It is in your list of documents. If you'd like to check, I can point you to where that is.

A. I believe you. It's just that I don't have memorized all the things that I reviewed.

Q. Of course. And so if I ask you if you've reviewed something, you can let me know.

MR. ANSTAETT: At this point, your Honor, I would move admission of DTX 1335.

THE COURT: Any objection?

MR. WIESEN: No objection your Honor.

THE COURT: All right, admitted.

(Defendant's Exhibit DTX 1335 received in evidence)

Q. Would you turn to the last page of the exhibit please? Do you see the authors listed there including Drs. Titelbaum, Arnon and Sela of the Weizmann Institute?

A. I see that.

Q. And Drs. Titelbaum Arnon and Sela are also three of the four of the the inventors of all the patents here, correct?

A. I believe that's correct.

Q. Do you see that was submitted in 1972?

(Continued next page)

Q. Doctor, I'm going to ask you a couple of questions that you already answered before, just so the record is complete, make sure we have the transcript.

You saw that this publication was submitted in 1972, correct?

A. Yes.

Q. All right. I'm going to ask you to again turn back one page to page number 565, and look at the top of the page and the first column. And do you see that the authors are describing a molar ratio for copolymer-1?

A. Yes.

Q. Molar ratio they describe is 6.0 to 1.9 to 4.7 to 1.0 correct?

A. That's correct.

Q. And that's the molar ratio, same molar ratio as batch one in the Teitelbaum 1971 paper, correct?

A. Yes, that's batch one.

Q. All right.

A. 1971 paper, yes.

Q. And here the authors mention only the molar ratio of Teitelbaum batch one, correct?

A. As far as I can see, without rereading the whole paper, I believe that's what it says.

Q. All right. And the authors did not round the molar ratio here to whole numbers, did they, Doctor?

A. They present the numbers with single decimal point.
Q. But two significant figures?
A. Yes.
Q. Please turn to DTX-1325 in your binder?
A. DTX-1325?
Q. D, as in defendant, yes, 1325?
A. 1325. I have it.
Q. All right. Doctor, you see this is a publication from 1980?
A. Yes.
Q. It's in the transaction of the American Neurological Association?
A. Yes.
Q. And, again, this is an article that you reviewed in preparing your expert reports, correct, Doctor?
A. I have seen it, yes.
MR. ANSTAETT: All right, your Honor, I move admission of DTX-1325?
MR. WIESEN: No objection.
THE COURT: Admitted.
(Defendant's Exhibit 1325 received in evidence)
Q. Doctor, please turn to the third page of the exhibit, I think it's page 348 if you're looking at the page numbers?
A. I have it.
Q. All right. Here again you recognize the name of the

Weizmann scientists, Teitelbaum, Arnon and Sela, correct?
A. Yes, I do.
Q. All right and just beneath, just beneath their names, this article again describes the molar ratio for copolymer-1 as 6.0 to 1.9 to 4.7 to 1.0, correct?
A. Yes. Again, that's the batch one from the 1971 paper.
Q. All right. And there is no report for batch two molar ration in this paper, correct?
A. Without reading it carefully, I could only say that that's the only one I see.
Q. All right. And this molar ratio is not rounded to whole numbers either, is it, Doctor?
A. That's correct.
Q. All right. Please turn to DTX-1109 in your binder. Doctor, we're looking at DTX-1109?
A. Yes.
Q. All right. And this is a paper from the Journal Immunological Review, is that correct?
A. Yes.
Q. And that's a paper that you reviewed in preparing your expert reports, correct, Doctor?
A. I believe so.
MR. ANSTAETT: All right, your Honor, I move admission of DTX-1109?
MR. WIESEN: No objection, your Honor.

THE COURT: Admitted.

(Defendant's Exhibit 1109 received in evidence)

Q. And, Doctor, you recognize the name of the author on this paper, a Dr. Arnon.

A. Yes, I do.

Q. She's on of the inventors on one of the patents-in-suit?

A. Yes.

Q. Scientist from the Weizmann Institute?

A. Yes.

Q. And this is a publication from 1981, correct?

A. That's correct.

Q. Turn to the page with the Bates number TEV-00030079, please.

A. I have it.

Q. And do you see the heading, expressive activity of the synthetic copolymers?

A. Yes, I do.

Q. And would you agree with me that in this paper, Dr. Arnon reports that most of our work has been carried out on co-polymer-1 in a molar ratio of 6.0 to 1.9 to 4.7 to 1.0?

A. I would agree, I would agree that that's what this states.

Q. All right. And again that's the batch one molar ratio from Teitelbaum 1971, correct?

A. Yes, that's correct.

Q. All right. Doctor, please turn to DTX-1110 in your binder.

A. I have it, DTX-1110.
Q. Correct?
A. Yes.
Q. And this is an article on which Doctors Teitelbaum, Arnon and Sela are also named as authors, correct?
A. That's correct.
Q. And if you look at the second page of at the bottom you'll see that is a paper from 1982?
A. Yes, I see that.
Q. And it was published in Annals of Neurology?
A. Yes. Yes, that's correct.
Q. And, Doctor, this was one of the articles you reviewed in preparing your reports, correct?
A. I believe.
MR. ANSTAETT: All right, your Honor, I move admission of DTX-1110?
MR. WIESEN: No objection, your Honor.
THE COURT: Admitted.
(Defendant's Exhibit 1110 received in evidence)
Q. All right. Doctor, please look at the first page, it's the one with the Bates number ending in 166. And do you see the paragraph entitled "Materials and methods"?
A. Yes, I see it.
Q. All right. And, again, this reports a molar ratio for co-polymer-1?

A. Yes, it does.
Q. And that's the same 6.0 to 1.9 to 4.7 to 1.0 molar ratio as in Teitelbaum batch one, correct?
A. Yes, that's correct.
Q. All right. Doctor, please turn to PTX-31 in your binder.
MR. ANSTAETT: And for the record, your Honor, this is an exhibit that was entered into evidence in the July trial during Doctor Arnon's direct examination?
THE COURT: All right, it's admitted.
Q. Are you there, Doctor?
A. I am.
Q. All right. Please turn to the second page of the exhibit. And you reviewed this article, correct?
A. I believe so.
Q. And this is an article that was published in 1987, correct?
A. Yes.
Q. And it reports the results of a pilot trial overseen by Dr. Murray Bornstein in which co-polymer-1 was administered to patients, correct?
A. That's my understanding.
Q. All right. And you're aware that before Teva became involved with co-polymer-1, it was the Weizmann Institute and subcontractor Weizmann called Bio-Yeda that manufactured co-polymer-1, right?
A. I don't know the exact relationship of the companies and

the researchers.
Q. So you don't know whether they were subcontractor, is that what you're saying?
A. Yes, I know that -- I know that Weizmann Institute people Yeda and Teva were involved, but I don't know what their relation was.
Q. Okay. Well, look at page 409 of the article, please, Doctor. It's the third page of the article. And if you look at the first column under preparation and characterization of co-polymer-1; do you see that?
A. Yes, I see it.
Q. It says, cop-1 was first prepared by the Weizmann Institute of Science, Rehovot, Israel, and later by the Bio-Yeda Company in Rehovot, correct?
A. Yes, I see that.
Q. All right. If you turn to page number 411 of PTX-31, please. And if you look at the second full paragraph at the top of the first column. Would you agree with me that the Bornstein paper reports that patients in this clinical trial were treated with co-polymer-1 supplied by the Weizmann Institute or with co-polymer-1 supplied by Bio-Yeda?
A. I would agree that that's what it says, here.
Q. All right. And please turn to page 408. And the Bornstein 1987 paper reports a molar ratio for co-polymer-1 of 6.0 to 1.9 to 4.7, to 1.0, correct?

A. That's what it says here.
Q. All right. Now, Doctor, please turn to PTX-597 in your binder.
MR. ANSTAETT: And, your Honor, this is an exhibit that was admitted in the direct examination of Dr. Lisak.
THE COURT: All right.
Q. You were here for Dr. Lisak's testimony, correct, Doctor?
A. Yes, I was.
Q. Doctor, please turn to page three of PTX-597. And at the bottom of the page, do you see the date July 1995?
A. I'm sorry, page three do you mean?
Q. The third page of the exhibit?
A. Oh, okay. And what was the question, please?
Q. Do you see the date July 1995 at the bottom of the page?
A. I do.
Q. All right. This is from the Journal of Neurology?
A. Yes.
Q. And this article relates to a later clinical trial of co-polymer-1, correct?
A. That's my understanding.
Q. And again this is the Johnson paper that Dr. Lisak discussed in his direct examination?
A. I believe that's so.
Q. All right. And if you look at the bottom of the first page of the article, just following the abstract, do you see the

second sentence identifying Copaxone is the medication the patients in the trial were treated with?

A. Yes, I do.

Q. All right. And you recognize Copaxone as Teva's trade name for co-polymer-1?

A. Yes.

Q. All right, please turn to page 1270 of that article. If you look at the second full paragraph. Are you there?

A. I'm sorry, what page?

Q. I want you to look at page 1270?

A. 1270. I have it.

Q. All right. And you're looking at the second full paragraph?

A. Conduct of the study?

Q. No, the study medication. And if it helps, it's up on the screen.

A. Yes, I have it.

Q. All right. And you agree with me that the medication in this study was supplied by Teva, correct?

A. It's stated here that the study medication was supplied by Teva Pharmaceuticals.

Q. All right. Now, turn one page back, please, to page 1269 of the article?

A. Yes.

Q. And if you look at the first full paragraph on that page?

A. Yes.
Q. And the Johnson trial reports that the molar ratio for the co-polymer-1 composition used in this clinical trial was 4.2 to 1.4 to 3.4 to 1.0, correct?
A. That's what's written here.
Q. And that's a different molar ratio than was reported in the previous papers we looked at, correct?
A. It's different from the molar ratios we've been quoting.
Q. And this molar ratio tells you that for every 1.0 tyrosines, there are 4.2 alanines, 1.4 glutamic acids, and 3.4 lysines, correct?
A. Yes, that's correct.
Q. And that's a different molar ratio, for example, than the molar ratio that was reported in the Bornstein 1987 paper, isn't it?
A. Numerically, it's a different molar ratio.
Q. All right. And we agree that the Bornstein 1971 copolymer-1 was manufactured by either the Weizmann Institute for by Yeda, right?
A. I believe we did agree that.
Q. All right. And we also agreed that the Johnson 1995 co-polymer-1 was manufactured by Teva?
A. I believe so.
Q. All right.
A. It was supplied by Teva, I believe it said.

Q. All right. Now, Doctor, do you have any reason to doubt the accuracy of the molar ratio reported in the Johnson paper for co-polymer-1?
A. I have no reason to doubt it or accept it. It says what it says.
Q. All right. Now, Dr. Kent is Mylan's expert; you know that, right?
A. Yes.
Q. And he submitted a -- he submitted a second expert report in this case, correct, that you reviewed?
A. Yes.
Q. And Dr. Kent calculated the molar ratio of Copaxone to be 4.5 to 1.5 to 3.6 to 1.0, correct?
A. Could you show me where that is?
Q. Sure. You've got Dr. Kent's report up there, and if you turn to pages 13 to 14, and it's paragraph 43, you can look in table five, I believe you could see in table -- are you at table five?
A. I am.
Q. And do you see where it says Copaxone molar ratio calculated?
A. Yes, I do.
Q. And so Dr. Kent calculated the molar ratio for Copaxone as for every 1.0 tyrosines, there were 4.5 alanines, 1.5 glutamic acids and 3.6 lysines, correct?

A. Just a moment. Could you repeat the question, please?
Q. Sure. Dr. Kent calculated the molar ratio for Copaxone in which there was for every one tyrosine, 4.5 alanines, 1.5 glutamic acids and 3.6 lysines, correct?
A. Yes, that's correct.
Q. All right. And the molar ratio reported for Copaxone in the Johnson paper is very close to the mole ratio that Dr. Kent calculated for Copaxone, correct?
A. The mole ratio that's presented in the neurology paper is close to that, yes.
Q. All right. Doctor, please turn to DTX-1999 in your binder?
A. DTX-1999?
Q. Correct. And, Doctor, do you recognize the name of the first author on this publication?
A. Ruth Arnon, I do.
Q. That's one of the inventors on the patents-in-suit?
A. Yes.
Q. And this is a paper that was published in the proceedings of the National Academy Of Sciences or NAS, correct?
A. That's correct.
Q. And that's a reputable journal in your field, isn't it, Doctor?
A. Yes, it is.
Q. And do you see that the article was published in October of 2004?

A. I see that.
Q. And if you look at the first sentence of the abstract, do you see that refers to Copaxone?
A. I see the Copaxone is written there, yes.
Q. All right. And if you could look at the first paragraph after the abstract, and I want to focus your attention on the fourth sentence in that paragraph. And here Dr. Arnon is reporting molar ratio for glatiramer acetate of 4.2 to 3.4 to 1.4 to 1.0, correct?
A. That's correct.
Q. And if we state that ratio in the same order as in the Johnson paper, put the amino acids in the same order, that would be a molar ratio of 4.2 alanines to 1.4 glutamic acids to 3.4 lysines for every 1.O. tyrosines, correct?
A. That's my understanding.
MR. ANSTAETT: And, your Honor, I move admission of DTX-1999.
MR. WIESEN: No objection, although I'm not sure there is any evidence of Dr. Gokel has ever seen this document.
THE COURT: Okay. It's admitted.
(Defendant's Exhibit 1999 received in evidence)
THE COURT: I'm sorry, where did you see the molar ratio?
MR. ANSTAETT: Yes, your Honor.
THE COURT: What page was that?

MR. ANSTAETT: It is on the first page, I believe, and it's the first paragraph after the abstract. And, Nick, maybe we can bring that up a little bit larger?

THE COURT: It's right on the first paragraph. I see it. Thanks.

(Continued on next page)

Q. Now, Doctor, in every publication that we've looked at so far that reports molecular weight for copolymer-1 or Copaxone, the tyrosine ratio has always been reported as 1.0, would you agree with that?
A. As we've looked at it, it has been.
Q. In your expert report you calculated the mole percentages of Teva's Copaxone, correct?
A. Yes.
Q. And I want you to look at page 21 of your reply expert report in the Mylan case. You should have your expert reports up there in a binder.
A. Reply expert report?
Q. Yes, sir. I want to focus your attention on page 21 and in particular on table seven.
A. Yes.
Q. Now, in this table you identified the mole percentages of the amino acids in the composition with a molar ratio of exactly 6:2:5:1, do you see that?
A. Yes, sir.
Q. And the mole for tyrosine in that composition the molar ratio was 7 percent, is that correct?
A. That's correct.
Q. And you also identified the molar percentage of the amino acids in Copaxone in the last column correct?
A. That's correct.

Q. And the mole percent for tyrosine in the Copaxone is 9.5 percent?
A. That's correct.
Q. Now, in relative terms, Copaxone contains 35 percent more tyrosine than a copolymer-1 composition with the molar ratio of exactly 6:2:5:1, correct?
A. That's not how I see it.
Q. Well, do you know how to calculate the relative difference between two numbers?
A. I certainly know how to calculate the relevant difference between two numbers.
Q. All right and the relative difference between the 77 percent -- well, let me ask you this: Those numbers reflect in terms of a relative difference, a 35 percent difference in the tyrosine content of Copaxone as compared to a copolymer-1 composition with the molar ratio of exactly 6:2:5:1, correct?
A. No.
Q. All right. Doctor, your deposition transcript is in that same binder you're looking at.
A. Okay.
Q. And you remember your deposition back in January of 2010?
A. I remember that you took my deposition.
Q. I think it was January 2011.
MR. WIESEN: I'm sorry, your Honor, I need a moment to find my copy of the transcript.

Q. Are you there, Doctor?
A. Yes.
Q. I'm going to ask you to turn to page 72.
MR. WIESEN: And, your Honor, I'd ask that counsel identify the page and line number before reading it into the record so we can all analyze whether it's proper impeachment.
A. I think you gave me the deposition transcript, but I can't find it.
MR. ANSTAETT: Do you have the binder with Dr. Gokel's expert reports in there?
THE COURT: Is it in there?
MR. ANSTAETT: The last half of that should be.
THE COURT: I see. Thank you. Do you have a page and the line for us?
MR. ANSTAETT: Yes, your Honor. Page 72, starting at line 17 and running through page 73, line 12.
May I proceed, your Honor?
THE COURT: Yes.
Q. You remember at your deposition I asked you to calculate the relative difference between the tyrosine content in Copaxone and the tyrosine content in a copolymer-1 composition with a molar ratio of exactly 6:2:5:1, correct?
A. Well, I remember that you asked me to do the division of these numbers.
Q. That's right. And you calculated a relative difference,

correct, Doctor? Between those two numbers?
A. I calculated the difference between those two numbers, yes.
Q. And the answer that you got when I was taking your deposition was 35.7 percent, correct?
A. That's what it says here. I suppose that's correct.
Q. All right, thank you. Let's look at slide 73, can we, from Dr. Gokel's -- Doctor, you remember this slide from your direct examination yesterday?
A. Yes, I do.
Q. In this slide you identified the molar fractions for Mylan's product, correct?
A. Yes, that's correct.
Q. And the molar fractions for tyrosine in Mylan's product is .092, correct?
A. That's correct.
Q. And you also identified the molar fractions of the amino acids in the composition with a molar ratio of exactly 6:2:5:1, correct?
A. That's correct.
Q. And the tyrosine molar fraction is .07, correct?
A. The molar fraction exactly 6:2:5:1 for tyrosine is .07, that's correct.
Q. All right. And based on these tyrosine molar fractions, in relative terms, Mylan's product contains about 30 percent more tyrosine than the copolymer-1 composition with a molar ratio of

exactly 6:2:5:1, correct?
A. Well, the numbers 0.7 and 0.9 differ by that amount, but I would see it as 8 percent plus minus 1, not a major difference.
Q. But the numbers, the relative difference between those two numbers is about 30 percent, correct?
A. Yes, no one could argue with the division. The numbers say what they say, but that's not what, how I think one would analyze this.
Q. And Doctor, those numbers, the .07 for exactly 6:2:5:1 and the .092 for Mylan's GAM lot 00109, those were on the same scale, correct?
A. They are on the same scale, but they are not on the scale compared to 6:2:5:1. They are on the same scale in this representation.
Q. They are on a scale of 1, the same scale in this representation, correct, Doctor?
A. The scale --
Q. Correct? We were talking over one another --
A. I was talking first.
Q. That makes the court reporter's life harder. But we can agree that these molar fractions reported here are on the same scale, correct?
A. Yes, they are.
Q. Now, Dr. Gokel, yesterday you looked at some pages from Mylan's ANDA that shows some of the process steps used in

making Mylan's glatiramer acid product, correct?
A. I'm sorry, I lost my focus for a second.
Q. Sure. Yesterday you looked at some pages from Mylan's ANDA that showed some of the process steps used in making Mylan's glatiramer acetate product, correct?
A. Yes.
Q. I want to shift directions now to your direct examination binder and if you could look at PTX 321 of that binder.
A. PTX 321?
Q. Yes.
A. I have it.
Q. Please turn to the page Bates number Mylan 212?
A. I have it.
Q. This is one of the pages of Mylan's ANDA that you talked about in your direct examination, correct?
A. That's correct.
Q. And this shows the first deprotection step in Mylan's process for the manufacture of glatiramer acetate?
A. That's correct.
Q. And that step was also in the formation of TFA cop-1, correct?
A. Yes, trifluoroacetyl copolymer-1, yes.
Q. And TFA cop-1 in the Mylan process is referred to as GAM F2, correct?
A. I believe that's correct.

Q. Sure. You looked at that table of abbreviations yesterday.
A. Yes, I did, and that's correct.
Q. Now, Doctor, please turn to page 262.
MR. ANSTAETT: Your Honor, I guess most importantly if we could just publish this page on private screens?
A. All right.
Q. And do you have that page?
A. 262?
Q. Yes.
A. Yes.
Q. All right. And you did not discuss this page from Mylan's ANDA in your direct examination, correct?
MR. WIESEN: Your Honor, I need to object to the form of that question in that it was actually in the outline and we stipulated away a part of the discussion, but I don't think it goes to what --
MR. ANSTAETT: And I'll withdraw the question.
Q. Dr. Gokel, these are the manufacturing steps for manufacturing TFA cop-1, correct?
A. That's my understanding.
Q. Do you see step 4?
A. I do.
Q. In that step the hydrobromic acid in acetic acid solution is treated with phenol, correct?
A. Step 4 simply says add phenol.

Q. Well, do you see --
A. Excuse me. The step is hydrobromic acid acetic acid, yes.
Q. So we can agree in that step hydrobromic acid and acetic acid is treated with phenol?
A. Phenol is included in the solution, yes.
Q. You didn't discuss Mylan's use of phenol in the process of forming TFA cop-1 yesterday, did you?
A. No.
Q. Doctor, are you familiar with a fifth amino acid called bromotyrosine that could arise in copolymer-1 under certain circumstances?
A. I am aware that bromotyrosine is an impurity that is occasionally found in copolymer-1.
Q. And Dr. Kent discussed the formation of bromotyrosine in copolymer-1 in his second expert report in this case. Do you remember that?
A. Yes.
Q. You reviewed that report?
A. Yes.
Q. Dr. Kent described in that report his belief that absent the use of phenol to treat the HBr acetic acid solution used to make cop-1 up to 30 percent of the tyrosine in cop-1 can be converted to bromotyrosine, correct?
MR. WIESEN: Objection, your Honor. He's now characterizing an expert report from an expert who has not yet

taken the stand. I think that's hearsay and also not a quote from the expert report.

MR. ANSTAETT: Your Honor, he has reviewed these opinions and responded to that.

THE COURT: I'll see whether Dr. Gokel is familiar with what you're talking about and whether he can answer the question.

Q. Sure. Dr. Gokel, you have Dr. Kent's second expert report in front of you, correct?

A. Perhaps.

Q. That's the one with the spiral binder, kind of spiral bound?

A. Yes.

Q. And you reviewed that expert report in preparing your opinions in this case, correct?

A. Yes.

Q. And you responded to Dr. Kent's opinions that he presented in that report, correct?

A. Yes.

Q. And you reviewed Dr. Kent's report, correct?

A. Yes.

Q. And Dr. Kent in that report described his belief that absent the use of phenol to treat the HBr acetic acid solution used to make TFA cop-1 up to 30 percent of the tyrosine in copolymer-1 could be converted to bromotyrosine, correct?

THE COURT: Could you refer me to where that is?

MR. ANSTAETT: Of course, your Honor. It's in the second Kent report, page 17, if you look at paragraphs 54 to 55.

THE COURT: Thank you.

Q. Do you see that, Doctor?

A. 54 and 55.

Q. Yes, sir.

A. Mm-hmm. Yes, I have the paragraphs. If you could just give me a moment to review.

Q. All right. Now, what I want to actually focus you on is your own expert report, Doctor.

THE COURT: Hold on a second. I think we're both trying to read the paragraphs you referred us to.

A. I'm a little slow.

MR. ANSTAETT: I apologize.

(Pause)

A. I've read this.

Q. Okay. And you have responded to those paragraphs in your reply expert report in this case, didn't you?

A. I believe so.

Q. All right, and I don't want to be unfair. What I want to ask you about is your reply expert report that's in the binder under your expert reports, and it's at page 22, paragraph 56.

A. Reply.

Q. Reply, yes. It might be the third report in there.
A. And at page 26, you say?
Q. It's page 22, paragraph 56.
MR. WIESEN: Your Honor, I'm going to object to this line of questions. He can impeach with the expert report if there's contradictory testimony, but simply making him read paragraphs is improper.
MR. ANSTAETT: I just want him to look at the paragraph in which he responded.
THE COURT: Well, it's just this one paragraph, 22?
MR. ANSTAETT: Page 22, it's actually paragraph 56, your Honor.
THE COURT: Why don't you ask your question?
MR. WIESEN: Thank you, your Honor.
MR. ANSTAETT: Okay.
Q. Now, Dr. Gokel, in your expert report you said that you were aware of no support for the proposition that --
THE COURT: No. You have to ask a question.
Q. Dr. Gokel, are you aware of any evidence that copolymer-1 prepared without the use of phenol has 30 percent of its tyrosine content converted to bromotyrosine? Would you agree with that?
A. I'm sorry, I didn't understand the question, I guess.
Q. Well, would you agree in your opinion that copolymer-1 prepared without the use of phenol to pretreat the HBr in

acetic acid solution can have up to 30 percent of its tyrosine content converted to bromotyrosine?

A. Would I agree that if it is, if something is pretreated with phenol -- I must not be understanding your question.

Q. All right. In your opinion, could copolymer-1 that was synthesized without pretreating the HBr in acetic acid solution used in the second step to make TFA cop-1 --

A. May I clarify here? So you're using HBr, acetic acid but no phenol.

Q. No phenol.

A. Is that the question?

Q. Yes.

A. Go ahead.

Q. Would you agree that up to 30 percent, under those circumstances that up to 30 percent of the tyrosine content in that copolymer-1 could be converted to bromotyrosine?

A. No.

Q. All right. Doctor, please turn to DTX 1167 in your binder.

A. DTX 116?

Q. 1167. This is -- I'm sorry, let me know when you're there. Are you there?

A. No. DTX 116?

Q. 1167 in your cross-examination binder.

A. Yes, I have it.

Q. Do you see this is a Teva document, Doctor?

A. It appears to be.
Q. If you look at the first page, it's dated August 13, 1989.
A. That's the date.
Q. I'm sorry, I missed that.
A. That is the date.
Q. Thank you, sir. And if you would turn to the page with the Bates number TEV1048032, please, and would you please read the first sentence of subparagraph B.
A. Traces of free bromine in the recent batches of HBr used at Natanya were found to induce tyrosine bromination. Up to 30 percent of the tyrosine residues were brominated.
Q. So according to this Teva document copolymer-1 could have up to 30 percent of its tyrosine content converted to bromotyrosine, correct?
A. What this document says here is not what I answered in your question. Because I don't know the quality of their HBr.
Q. But you would agree with me that this document says that up to 30 percent of the tyrosine residues were brominated, correct?
A. I would agree with you that that's what Teva says here and I don't know what their reaction conditions were. This is all I know about it.
Q. And the document also states that this tyrosine bromination resulted in a decreased tyrosine content in the copolymer-1, correct?

A. Yes.
Q. And this document also says that the tyrosine bromination resulted in increased amino acid ratios, correct?
A. Those would be natural consequences of reducing one of the amino acids.
Q. Now, do you see in DTX 1167 where it says Teva developed chemical methods to treat every HBr batch in order to prevent this reaction?
MR. WIESEN: Your Honor, I'm going to object. He seems to be crossing the line from the infringement issue into the best mode and validity issue which we intentionally did not discuss in Dr. Gokel's testimony.
THE COURT: I'm not sure that's what he's doing.
MR. ANSTAETT: I'm absolutely not crossing that line this has everything to do with the molar ratio and copolymer-1 --
THE COURT: Well, right or wrong that's what I thought he was doing, too. We'll see. However, I don't know where you are in this document right now.
THE WITNESS: Me, too.
Q. I'm still under and it's highlighted on the screen now, Dr. Gokel, do you see in the document where it says we developed chemical methods to treat every HBr batch in order to prevent this reaction?
A. I see the statement that's partly highlighted.

Q. All right. And the chemical method that was developed to prevent the formation of bromotyrosine in Teva's product was the pretreatment of the HBr acetic acid solution with the phenol, correct?
A. I believe that that's one of the methods that they used.
Q. All right.
MR. ANSTAETT: And your Honor I move admission of DTX 1167.
MR. WIESEN: No objection.
THE COURT: All right, admitted.
(Defendant's Exhibit DTX 1167 received in evidence)
THE COURT: I think I would like to take a break now and come back, sit until one and then take lunch. Do you want to ask another few questions in this area or are you going to move?
MR. ANSTAETT: We can take a break now.
THE COURT: Then we'll take our regular ten-minute break.
(Recess)
BY MR. ANSTAETT:
Q. Dr. Gokel, we were talking about Teva's use of phenol to prevent formation of bromination in copolymer-1, correct?
A. Yes.
Q. Please look at DTX 87 that's in your binder and if you look at the page with the Bates number 1145249 you see that this is

a memo from Dr. Ilan Schwartz the analytical project coordinator for copolymer-1 at Teva?
A. I see his name at the bottom of the page.
Q. Would you turn back to the page before that, please?
A. Do you mean 248?
Q. 248, yes. Would you read the last paragraph on that page for me?
A. To eliminate the possibility for bromination of cop-1, phenol was added into the reagent used in the debenzylation step. Using this procedure, the level of bromotyrosine seen fell dramatically below the specifications.
Q. So according to this document, by using phenol to pretreat the HBr acetic acid solution the level of bromotyrosine in Teva's copolymer-1 fell dramatically below Teva's specifications, correct?
A. That's what it says here.
MR. ANSTAETT: Your Honor I move admission of DTX 1187.
MR. WIESEN: No objection.
THE COURT: Admitted.
(Defendant's Exhibit DTX 1187 received in evidence)
Q. Doctor, in your direct examination you discussed what I will call the Crabb paper, do you recall that?
A. I do.
Q. That's PTX 558. For that document I'm going to ask you to

look in your direct examination binder, please.
A. Yes, I have it.
Q. If I understood you correctly yesterday, you reviewed this paper because you believe it supports the opinion that a 1989 amino acid analysis -- I'm sorry, a 1989 amino acid analysis that generally resulted in a precision of 10 to 20 percent, is that correct?
A. Yes, that's correct.
Q. Now, Dr. Gokel, the samples that were analyzed in the Crabb paper were of a purified protein, correct?
A. Yes.
THE COURT: Pure what?
MR. ANSTAETT: Purified protein.
THE COURT: Purified.
Q. And the protein analyzed --
A. No, actually, we needed to clarify that. In one case the samples were the purified protein and in the other case they were the prehydrolized. So the prehydrolized wasn't actually a protein.
Q. I'm going to ask you to look at table 2.
A. Okay.
Q. This is one of the tables you referred to in your testimony yesterday?
A. Yes, I believe I referred to tables 2 and 3.
Q. All right, and let me step back and ask you this. The

sample that was analyzed in the Crabb paper was not a copolymer peptide mixture consisting of only four amino acids, correct?
A. That's correct.
Q. And if we look at table 2, the protein analyzed in this paper contains 17 different amino acids, correct?
A. I haven't counted them. I take your word for it.
Q. And that's in the first column that's on your screen. Doctor let me ask you this: Do you know of any comparable data for evaluating the precision of the amino acid analysis of a copolymer peptide mixture for a copolymer like copolymer-1 that has only four amino acids?
A. So you mean a comparable analysis where it was sent to many different laboratories and had many different analyses done, is that what you mean by comparable?
Q. No. What I mean is have you seen any data that would give you what kind of precision you could expect from amino acid analysis of a copolymer-1-like composition?
A. I guess I'm still not understanding the question. If it's a broad-based analysis such as this one, are you asking is it that broad-based analysis of a copolymer or a more limited polymer, is that the question?
Q. The question is have you seen any documents that would suggest to you what kind of precision you could expect in doing amino acid analysis of a copolymer-1-like composition with four amino acids?

A. I don't recall one.
Q. All right. Would you look at DTX 2047 in your binder, please?
A. The other binder?
Q. The cross-examination binder, please. Are you there?
A. Yes, I am.
Q. Okay. If you would look at page with the Bates number TEV3370, please.
A. Just a moment. I'm trying to calibrate myself on what this is.
Q. Of course, Doctor.
A. Is there a date on this document?
Q. Doctor, I'll represent to you that this is an excerpt from Teva's NDA which was filed in 1995.
A. Okay, and what page do you want me to turn to?
Q. 3370, please, Doctor.
A. I'm there.
Q. Do you see the title of the document is copolymer-1 determination of amino acid content method validation?
A. Yes, I see it.
Q. Do you see the section number 5.2 labeled precision?
A. Yes.
Q. And do you see where it describes the repeatability finding?
A. Yes.

Q. Would you please read that section?
A. Repeatability. Several amino acid standard solutions as well as samples of copolymer-1 B.N. 03494 were analyzed as described in the method. The results of the amino acid molar fractions showed good reproducibility with a relative standard deviation of less than 2 percent.
Q. All right. And this document also discusses reproducibility. Do you see that?
A. Yes, I do.
Q. And that's in a laboratory, correct, in other words that's two different laboratory looking at a copolymer-1 sample doing an amino acid study?
A. Reproducibility means to a scientist that the reaction has been run more than once. This says that it was done in two different laboratory, but I don't know what laboratory or any information about them.
Q. Would you read the two sentences under reproducibility, please?
A. Certainly. Four copolymer-1 batches were analyzed in two different laboratories. The difference in the results obtained in the two laboratories was less than 5 percent.
Q. Doctor, please turn to DTX 1685 in your cross-examination binder. Doctor, you've reviewed this patent, correct?
A. Yes.
MR. ANSTAETT: Your Honor, I move admission of DTX

1685.

MR. WIESEN: No objection.

THE COURT: All right.

(Defendant's Exhibit DTX 1685 received in evidence)

Q. Doctor, who is the patent assigned to?

A. The assignee is listed as Yeda Research and Development Company, Limited.

Q. What's the title of the patent?

A. The title is copolymer-1 related polypeptides for use as molecular weight markers and for therapeutic use.

Q. Who is the inventor?

A. Alexander Gad.

Q. Do you recognize Dr. Gad as a Teva employee?

A. I can't be sure.

Q. I ask only because the list of materials that we were given in your expert report says that you reviewed Dr. Gad's deposition transcript.

A. If I did and he's an employee, fine.

Q. Please look at column 2, lines 46 to 55.

A. Column 2, line 54?

Q. Column 2, lines 46 to 55.

A. I have it.

Q. All right. This section of the patent describes both molar fractions and a molar ratio for glatiramer acetate, correct?

A. Just a moment. Would you repeat the question?

Q. Sure. This section of the patent describes both molar fractions and the molar ratio for glatiramer acetate, correct?
A. Yes, it does.
Q. And the molar fractions are 0.427 for alanine, 0.141 for glutamic acid, 0.37 for lysine and 0.093 for tyrosine, correct?
A. That's correct.
Q. And, Doctor, molar fractions can be used to calculate a molar ratio, correct?
A. That's correct.
Q. And the Gad patent reports a corresponding molar ratio for glatiramer acetate of approximately 4.6 to 1.5 to 3.6 to 1.0, correct?
A. 4.6, yes, those are the numbers that are written here.
Q. And that molar ratio is very similar to the molar ratio Mylan's Dr. Kent calculated for Copaxone, correct? I'll represent to you that Dr. Kent's calculation was 4.5 to 1.5 to 3.6 to 1.0.
A. Then the numbers are close to each other.
Q. All right. Now, the molar ratio reported in the Gad patent was calculated by dividing each of the molar fractions by the molar fraction for tyrosine, which is the least abundant amino acid here, correct?
A. I don't know where it says that in the patent. It simply says that this is an approximate ratio. If you could direct me to where it says that that's the molar ratio, that that was

calculated based on tyrosine.
Q. I'm going to ask you to do the calculations yourself, Doctor, and if I may approach and give Dr. Gokel a calculator?
THE COURT: All right.
Q. Now, Dr. Gokel, first let me ask you, do you know how to calculate a molar ratio normalized to tyrosine from molar fractions?
A. Do I know how to calculate the molar ratio based on -- I'm sorry, what was the question?
Q. Using these molar fractions would you know how to calculate a molar ratio based on tyrosine, normalized to tyrosine?
A. Well, if it's -- I'm sorry, the molar ratio is given here.
Q. Would you know how to calculate a normalized to tyrosine molar ratio --
A. You mean use the numbers at the bottom and multiply .93 make it equivalent to 1, is that what you're asking and then go through?
Q. Why don't I walk you through it, Doctor, if you're having difficulty?
A. I'm having difficulty understanding the question, I'm afraid.
Q. Okay. Let's do this: The molar fraction, those are the numbers at the bottom, correct?
A. Yes.
Q. 0.427, correct?

A. Yes.
Q. And if you divide that number by the fraction for tyrosine, .093, what do you get?
A. 4.59.
Q. All right, so if we were going to talk about two significant figures, could we say 4.6?
A. Certainly.
Q. Now, if you take the molar fraction for glutamic acid, 0.141, and you divide that by the fraction for tyrosine, .093, what do you get?
A. 1.52., 1.5.
Q. Could we call that 1.5?
A. Mm-hmm.
Q. And if you take the molar fraction for lysine, .337, and you divide that by the molar fraction for tyrosine, .093, what do you get?
A. 3.6.
Q. All right. Then of course we can agree if you divide .093 by .093, you're going to get 1.0, correct?
A. Yes, that's correct.
Q. All right, so you would agree with me that the molar ratio for glatiramer acetate reported in Dr. Gad's patent is normalized to tyrosine, wouldn't you?
A. The way we've done it.
Q. All right. Dr. Gad didn't get from those molar fractions

to that molar ratio by multiplying molar fractions by 14, did he?

A. No, but you could.

Q. You could -- well, let me ask you this. Let me give you as an example. 0.427, if you multiply that by 14, what do you get?

A. Sorry, which number?

Q. The fraction for alanine.

A. .427?

Q. Yes, if you multiply that by 14, what would you get?

A. 5.978.

Q. All right. Not 4.6, though?

A. No.

MR. ANSTAETT: Your Honor, I have no further questions.

THE COURT: Mr. Doyle?

MR. DOYLE: Yes. With any luck I can conclude close to 1:00.

THE COURT: Okay. Anything after 1 and people can blame you.

CROSS-EXAMINATION

BY MR. DOYLE:

Q. Good afternoon, Dr. Gokel.

A. Good afternoon.

Q. I'd like to discuss with you starting with the topic the

requirement of six of the claims that are asserted against Sandoz that the step 2 reaction takes place for a time predetermined by a test reaction and I'd like to focus on the Sandoz viscometer method. Now, at the very beginning of step 2, step 2 reaction in the Sandoz method involving the viscometer, has Sandoz fixed a specific target molecular weight for the copolymer-1 it is making?

A. Sandoz according to their documents has a specific target molecular weight.

Q. And that's 7300, right?

A. Yes.

Q. And at the very beginning of the step 2 reaction Sandoz in its viscometer method, it has a specific table of target temperatures for the step 2 reaction, right?

A. They have such a table.

Q. Yes, they have it at the very beginning --

A. They have it right now.

Q. Beginning of step 2. And at the very beginning of step 2 in the reaction involving the Sandoz viscometer method, does Sandoz include in that table with the temperatures a step of viscosity, a set of viscosity levels corresponding with the temperatures?

A. Table 1 that we talked about earlier is a table of temperatures and viscosity readings over a four degree range. Yes. Over a four degree range.

Q. And that's available at the very beginning of the step 2 reaction, correct?
A. Yes.
Q. Now, the purpose of the selected viscosity level is to judge when to stop the step 2 reaction, correct?
A. Yes.
Q. And the time it takes to reach that viscosity level at the preset temperature in the step 2 reaction, that's the time that the reaction will run, correct, when that viscosity level is reached?
A. Yes. The viscosity records the time at which to stop the reaction.
Q. Now, at the very beginning of step 2, Sandoz has not fixed a specific time period for the step 2 reaction that shall not be increased or decreased regardless of the viscosity level, has it?
A. I don't understand the question. They've not fixed -- I'm sorry, could you please restate it?
Q. My question is, at the very beginning of that reaction, Sandoz has not fixed a particular time, let's say 30 hours, just as an example, Sandoz has not set at the beginning of the step 2 reaction in its viscometer method that that step 2 reaction shall run 30 hours no matter what the viscosity level is?
A. They have fixed the temperature?

Q. They fixed the temperature.
A. Then I believe they have.
Q. Pardon?
A. Then I believe they have.
Q. You believe that no matter what happens in a viscosity reading, they will stop the reaction at exactly 30 hours in my example?
A. The viscosity reflects the time point at which the reaction should be stopped because they have calibrated their systems so that that viscosity correlates. Now, if you're asking me the question has something terribly wrong occurred, then perhaps something different would be done, but under routine circumstances the viscosity just reflects the time point. It's just like an alarm clock, because those ratios are predetermined.
Q. Again, if you could answer my question. The operator is operating the step 2 reaction, okay? And the operator will not stop the reaction until the viscosity level is reached, correct?
A. I think the operator will be directed not to stop and follow the viscometer. If that's your question, yes, I agree with that.
Q. Right. And there is nothing in the instructions to the operator to stop the step 2 reaction at a specific time set in advance, say, 30 hours later, regardless of the viscosity

level, is there?
A. Well, the operator will stop when the viscosity reaches a certain point, but if there's some variance that's because the viscosity is a problem, then there's the backup system of the time to correlate.
Q. I didn't ask you about the backup. I'm asking you about the viscometer method standing alone. Would you answer my question?
A. I'll certainly try to.
Q. And that question is, the operator has not been provided a specific time to stop the step 2 reaction regardless of the viscosity level at the beginning of the reaction, has it?
A. If the operator has been told do not stop this reaction until a certain viscosity is reached, then that's the instruction.
Q. And that is your understanding of the instruction for the Sandoz viscometer method, correct?
A. That's my understanding of the instructions to the operator.
Q. Now, we're in agreement, Dr. Gokel, that a viscometer does not measure time per se, does it?
A. A viscometer does not measure time per se.
Q. Now, what does a viscometer measure per se?
A. A viscometer measures what we can call the fluidity of a mixture or solution.

Q. Now, you would agree with me, wouldn't you, a viscometer is a fundamentally different kind of apparatus than a clock, right?
A. A viscometer is different from a clock.
Q. A viscometer has different parameters that it's measuring, correct?
A. A viscometer is different from a clock.
Q. And you described what the viscometer measures, which is whether it's like gasoline or whether it's like honey, right?
A. I said that.
Q. Now, you mentioned an alarm clock. Does an alarm clock measure any parameter of sleep that goes to the quality of the sleep?
A. Does an alarm clock measure any quality of sleep?
Q. That goes to the quality of the sleep?
A. To my knowledge, no.
Q. Right. As a matter of fact, it doesn't even tell you whether the person was asleep or awake, right?
A. I'll agree with that.
Q. Okay. And a clock couldn't measure any physical parameter of the step 2 reaction, could it? You know, other than how long the reaction in fact ran, correct?
A. A clock would measure duration.
Q. And no physical property, right?
A. No property of the chemical solution.

Q. Now, a viscometer, on the other hand, does directly measure a physical property of the copolymer-1 solution as it's being made, correct?
A. That's correct.
Q. Now, as I understand your opinions, Dr. Gokel, you place a great deal of emphasis on the historical data collected by Sandoz in its product development relating to time and temperature for the step 2 reaction, correct?
A. Yes.
Q. But you agree that Sandoz in the viscometer method is not using a specific time period at the beginning of the reaction to establish an absolute end point for the step 2 reaction, is it?
A. My understanding is that the end point for the viscosity measurement corresponds to the time the reaction needs to run at a specified temperature so that the desired molecular weight structure will be obtained.
Q. What you're saying is there is some sort of general correlation that Sandoz has developed as part of the development of its viscometry method in which there is some general correlation between the amount of time, the viscometry level and the temperature, correct?
A. There is a time viscometry temperature correlation, yes.
Q. Yes. But that correlation in general doesn't set the specific absolute end point of the step 2 reaction in the

viscometry method, does it?
A. All I can say is that the time, the temperature and the viscosity are all correlated.
Q. And what I'm asking you, sir, is about the step 2 reaction of Sandoz using the viscometer method, and when that reaction ends. And that reaction ends when the specific viscosity level is reached that correlates with a specific preset temperature, correct?
A. The way the batch records are set up, the operator is told to end at a particular viscosity that correlates with a particular temperature.
Q. Yes. And the operator cannot know with certainty that at a particular temperature and a particular viscosity level that that will be, for instance, precisely 30 hours after the reaction starts, can she?
A. If the person also has the time correlation, then he or she could know when that, what that time correlates to in terms of the viscosity.
Q. Yes, but my question is, talking about the operator, running the reaction, and you agree with me that the operator cannot just set this alarm clock that you mentioned and leave for 30 hours and come back with complete certainty that the viscosity level associated with a particular temperature has been reached, can she?
A. Not with complete certainty.

Q. I'd like to turn to a different topic. That is the composition of copolymer-1.
A. Yes.
Q. And by the way, have you done a study, is there anything in your report that describes the nature of the correlations between, with any specificity, the nature of the correlations between time, temperature and viscosity and the certainty of those? Have you done any analysis of that nature?
A. No, I relied on the analyses that were done by Sandoz.
Q. Thank you. Now, turning to the amino acid composition of copolymer-1, Dr. Gokel, would you agree that each batch of copolymer-1 can be described as an ensemble of closely related but different molecules?
A. That copolymer-1 is an ensemble of related but different molecules.
Q. Yes.
A. I think that's a fair representation.
Q. And those molecules are not identical in molecular weight, are they?
A. Not all of them.
Q. And why is that?
A. Why are they not the same molecular weight?
Q. Is it in all of this ensemble of all these molecules which I think you said something could be in the millions of billions, why is it that there are so many differences in

molecular weights of those molecules?
A. It's because the reaction that yields those many molecules is a polymerization, and that reaction occurs on many, many different shapes and may have many different starting points and after we do additional reactions to it that cleave it, we have different chains being cleaved in different ways. So there are a number of mechanisms by which the overall size and sequence of each system could be established. And that accounts for the variation.
Q. And that variation also applies to the length of the chains as well to their molecular weights because those two are related, correct?
A. I believe I just said that.
Q. And so we have non-identical amino acid sequences of great variety of molecular weights, correct?
A. Yes.
Q. Do you consider this ensemble to be a complex mixture?
A. It is certainly a mixture. I don't know of any formal definition of complex.
Q. Do you recall describing it as such in your deposition?
A. I probably did.
Q. And the number of different chain links that would be included in this complex mixture, would the different chain links, would there just be millions of different variations in this mixture?

A. Likely.

Q. And one final question in this area, sir. Due to the complexity of copolymer-1, would you say it's essentially impossible to show that one batch of copolymer-1 is structurally identical to another batch of copolymer-1? With today's technology.

MR. WIESEN: Objection, your Honor. I think he's going into the enablement and definiteness, but I'm not entirely sure at this point. Certainly beyond the scope of the issues that came up on direct.

MR. DOYLE: With just one question, I don't know, is he coming back? They won't tell us who is coming, your Honor, so just my one question about this area.

THE COURT: You're afraid you won't see Dr. Gokel again?

MR. DOYLE: I don't know for sure. I hope so.

MR. WIESEN: We believe he's likely to be called in rebuttal assuming they present all the defenses they told us they're going to, your Honor.

MR. DOYLE: Then we'll wait on that.

THE COURT: All right.

Q. The literature approach that you described that Momenta used to develop its generic product, I'll just ask a few questions about that and I'll be finished, okay? Do you recall testifying on direct you were shown a Momenta document and you

said, ah, the literature approach. Do you recall that?
A. Yes.
Q. Now, does the literature concerning copolymer-1 include the Weizmann Institute's '550 patent?
A. The '550 patent relates to polymers of that type, but I don't think copolymer-1 is named in the '550 patent.
Q. There's no reference -- could you turn to document 26 in your -- and you may well be right, so perhaps the better question, sir, is copolymer-1 one of the copolymers that is included in the '550 Weizmann Institute patent?
A. The patent describes polymers that have alanine, glutamic acid, lysine and tyrosine, and they claim weights, molecular weights between 15,000 and 25,000.
Q. And when was that patent issued, sir?
A. November 19, 1974.
Q. Now, that patent, it also describes a synthesis method for making such copolymers, correct?
A. Well, it describes that they were synthesized.
Q. Specifically, could you look at column 2, lines 53 to 63?
A. Yes, I have it.
Q. Okay. And does it describe there the synthesis of a protected copolymer using diethylamine as an initiator in the presence of dioxane?
A. It doesn't give any experimental details, but it gives a general approach.

Q. Yes and it includes diethylamine as an initiator in the presence of dioxane?
A. Yes, it does.
Q. Does it also describe using N carboxyanhydrides to tyrosine, alanine, glutamic acid and lysine?
A. Yes, it does.
Q. Does it describe using a benzyl protecting group on the glutamic acid?
A. Yes it does.
Q. Does it describe using trifluoroacetyl as a protecting group for the lysine?
A. Yes.
Q. Does the '550 patent describe deprotecting the glutamic acid by using hydrogen bromide in acetic acid?
A. It describes only deprotecting with hydrogen bromide.
Q. That was my question, sir. Does the '550 patent describe deprotecting the lysine by using piperdine?
A. Yes. I'm sorry, I misunderstood. I pronounce it piperdine. Yes.
Q. And you testified at length about the '808 patent I think on your direct testimony. You gave a lot of testimony concerning the '808 patent, correct?
A. I testified about the '808 patent.
Q. Are you aware that it specifically says that the copolymer-1 according to the present invention of the '808

patent may be prepared by methods known in the art, for example the process disclosed in U.S. Patent No. 3849550?

A. Yes.

Q. And that literature also includes the Teitelbaum article that we discussed so much yesterday and today, is that right, Exhibit 499?

A. That's correct.

Q. And that article, which is also back in the 1970's, of course, it has the same disclosure about how to synthesize copolymer, correct?

A. The same disclosure as what?

Q. As in the '550 patent.

A. It discloses a synthetic method. I don't know if it has the same details in it.

Q. Do you recall that in fact it has even more details, that the Teitelbaum article describes the quantities of the amino acids that are used in the starting material, correct?

A. That may be so.

Q. Now, in your direct, as I understood it, you relied on Exhibit 499 in providing your opinion on how a molar ratio approximately 6:2:5:1 should be understood in the meaning of copolymer-1, correct?

A. Yes, I did.

Q. Would you please look at page 244 of Exhibit 499? That's the Teitelbaum article.

A. Where?
Q. It's 499.
A. I have that, yes.
Q. Good, then if you would go to page 244.
A. 244.
Q. Mm-hmm. And specifically, if you would look at paragraph 3.7, molecular weight determinants?
A. Yes, I see it.
Q. Doesn't that identify ultracentrifugation as the method used for determining molecular weight?
MR. WIESEN: Objection, your Honor, this is well beyond the scope of the testimony that Dr. Gokel gave. He didn't talk about molecular weight at all except for relying on Dr. Grant.
MR. DOYLE: He spoke about this article to define copolymer-1. That's all I'm using it for.
THE COURT: How many more questions Mr. Doyle.
MR. DOYLE: One.
THE COURT: Okay.
Q. Does it identify ultracentrifugation as the method used for the molecular weight determination of this article?
A. It states here that an ultracentrifuge and sedimentation measurements were used.
Q. And you'd agree with me that that's a different technique than SEC, correct?

A. Yes.

MR. DOYLE: Nothing further, your Honor, thank you.

THE COURT: Okay.

MR. ANSTAETT: Your Honor, one housekeeping matter. I neglected to move DTX 2047, which I spoke to Dr. Gokel about, into evidence. I would like to do that now.

MR. WIESEN: No objection your Honor.

THE COURT: Yes, there was testimony about that. It's admitted.

(Defendant's Exhibit DTX 2047 received in evidence)

THE COURT: Do you have a redirect?

MR. WIESEN: I will probably have a short redirect, so we should probably take lunch.

THE COURT: All right. I'll see everybody at 2:00.

(Luncheon recess)

(Continued next page)

A F T E R N O O N S E S S I O N

2:00 p.m.

THE LAW CLERK: All rise.

THE COURT: Please be seated.

All right, Mr. Wiesen.

MR. WIESEN: Thank you, your Honor, just a short redirect.

REDIRECT EXAMINATION

BY MR. WIESEN:

Q. Dr. Gokel, do you have the cross-examination binder from Mylan from Mr. Anstaett in front of you?

A. I believe.

Q. If you could turn to DTX-1109.

A. I'm sorry, DTX?

Q. 1109.

A. I think it is a small chance I'm tired.

Q. Do you have it, sir?

A. I do, yes.

Q. Do you recall, if you turn to page eight under the heading: Expressive activity of the synthetic copolymers" that -- if we could blow up that paragraph?

A. Yes, at the bottom.

Q. Do you recall Mr. Anstaett on cross asked you about the molar ratio on the fourth line of this paragraph?

A. Yes, I do.

Q. And then he asked you whether there was any other molar ratio reported for any other batch in this paragraph in this paper?
A. I believe he asked me then.
Q. And if we could pull up, Mr. Chase, the next page as well and the top of the next sentence under the figure one, just two lines this time.
Do you see this carryover paragraph states, "On the other hand, several preparations of cop-1 showed identical effect?"
A. Yes, I do.
Q. So, sir, does this paper reference multiple batches of copolymer-1?
A. Yes, it does.
Q. And what paper does it cite for referring to the several preparations of co-polymer-1?
A. Titelbaum 1971.
Q. And do you recall whether there were different molar ratios reported in the two different batches in Teitelbaum 1971?
A. Yes, I do. They were two different molar ratios reported for batches one and two.
Q. Thank you, sir. If you could go to PTX-597 in your cross, I think it was in your cross-examination binder?
A. P?
Q. PTX-597 and P's are behind the D's so that's where you find

it?
A. Yes, I have it.
Q. If you could turn to the page 1269 on the bottom?
A. Yes, I have it.
Q. And the first full paragraph, I think Mr. Anstaett took you to the molar ratio reported there. Do you see that?
A. Yes.
Q. And I believe on your cross-examination you said that this is numerically different than 6:2:5:1?
A. Yes.
Q. Could you explain what you meant by that?
A. Yes. I believe that if you put it on the same scale as the 6:2:5:1 molar ratio, it will correspond.
Q. When you said numerically different, did you just mean there are actually different numbers reported here?
A. Yes, that's exactly what I said.
Q. All right, I want to look at a couple of the other molar ratios and molar fractions, Mr. Anstaett took you through.

If you could go to your Mylan reply expert report that he asked you about? On page 21 he asked about table seven. Do you recall that?
A. Sorry, I'm in the wrong thing. Table seven?
Q. Table seven on page 21?
A. Yes, I have it.
Q. And I want to look at the exactly 6:2:5:1 column in the

Copaxone column that he asked you about. Do you recall some questions about that?
A. Yes.
Q. Sir, in your opinion, is the molar fraction for Copaxone approximately the same as the molar fraction for 6:2:5:1, if you put them on a scale of one?
A. Yes.
Q. And, sir, if you put them on a scale of 100, so you're doing percent, do you have an opinion whether the percentage of each of the amino acids in Copaxone is approximately the same with the overall ratio as in exactly 6:2:5:1?
A. Yes, I believe it is.
Q. And if we look at table eight right below that in your report on page 21?
A. I have it.
Q. Have you converted the Copaxone molar fraction to a scale of 14 in the last column?
A. Yes, I have.
Q. And if you could just read into the record what's the result you report for Copaxone?
A. Excuse me. For alanine, it's 5.98, for glutamic acid 1.97, for lysine it's 4.73, and for tyrosine it's 1.33.
Q. And in your opinion, sir, is that molar ratio approximately 6:2:5:1?
A. Yes, it is.

Q. I just want to look at one other set of numbers that Mr. Anstaett ran you through. DTX-1685, if you could turn to that?
A. DTX-12?
Q. 1685?
A. 1685? Yes, sir, I have it.
Q. If we could go to column two, molar fractions that are on lines 50 -- looks like 52 to 55?
A. Column two, yes.
Q. And you see those molar fractions there?
A. I see the molar -- are we referring to the molar ratios that are present on line 49?
Q. No. I want to go to the molar fraction that's on line 53 and 54?
A. I'm sorry. Yes, I have those now.
Q. And on this one, do you recall Mr. Anstaett gave you a calculator and asked to you to do some calculations?
A. Yes.
MR. WIESEN: Your Honor, may I approach and ask him to do one other set of calculations?
THE COURT: Sure.
A. Do I get to keep his calculator?
Q. You can keep his calculator. I'll keep mine. And you're welcome come to it, Doctor.
If you could, sir, what scale are the molar fractions reported on in the 287 patent, DTX-1685?

A. 4.6 plus 1.5, plus 3.6.1 is the total of 10.7.
Q. I want to focus on the molar fractions, not the molar ratio.
A. I beg your pardon.
Q. Sorry. What scale are the molar fractions on?
A. Unity one.
Q. And so if you -- how would you convert from a scale of one to a scale of 14?
A. I would multiply by 14.
Q. Can you multiply each of the molar ratios reported here by 14?
A. I can try.
(Pause)
A. I have done.
Q. What numbers do you get, sir, if you multiply the molar fraction by 14?
A. 5.99, 1.97, 4.72 and 1.3.
Q. Sir, do you have an opinion whether that's approximately 6:2:5:1?
A. Yes, I believe it's approximately 6:2:5:1.
Q. If you converted the molar ratio that's reported here that's on the scale you said of 10.7 to a scale of 14, would that be approximately 6:2:5:1?
A. I will confirm. I don't do well with calculators. It will take me a second. I think he sabotaged this one.

(Pause)

A. The numbers that I get doing that are 6.026, 1.95, 4.71, and 1.31.

Q. And is that approximately 6:2:5:1?

A. Yes. In my opinion, it is.

MR. WIESEN: I have nothing further, your Honor.

THE COURT: All right.

MR. ANSTAETT: Nothing further from us, your Honor.

THE COURT: Okay.

MR. DOYLE: Nothing, your Honor.

THE COURT: Thank you very much, Dr. Gokel. You're excused.

THE WITNESS: Thank you.

(Witness excused)

THE COURT: Next witness.

MS. HOLLAND: Yes. Plaintiffs call Dr. Nicole Sampson.

MR. JONES: Your Honor, as Dr. Sampson approaches Mylan opposes and objects to her testimony. It is going to be cumulative of what Dr. Gokel just testified to. She's going to talk about multiply by 14 and 1.3, we've already heard plenty of that. So we would move for this witness be stricken to be heard on the equivalent issue.

MS. HOLLAND: Your Honor --

THE COURT: Well --

MS. HOLLAND: I'm sorry.

THE COURT: Go ahead.

MS. HOLLAND: Yes, your Honor. This is a separate issue. It's infringement under the doctrine of equivalence on the molar ratio issue. So there may be some overlap, but basically it's a separate issue that Dr. Sampson is going to be addressing. Its related to what Dr. Gokel addressed. And defendants had asked us ahead of time which witnesses is going to be addressing doctrine of equivalence and we gave them that information so they could prepare separate examination for that.

THE COURT: All right, I'm going to overrule your objection and hear the witness.

Dr. Sampson, would you raise your right hand.

NICOLE SAMPSON,

called as a witness by the plaintiff,

having been duly sworn, testified as follows:

DIRECT EXAMINATION

BY MS. HOLLAND:

MS. HOLLAND: I'm just going to hand up the binders now, your Honor.

THE COURT: Okay. Is this Teva's last witness?

MS. HOLLAND: We have depositions we will be submitting, but the last witness.

THE COURT: All right.

BY MR. SKILTON:

Q. Where do you live, Dr. Sampson?

A. I live in Setauket, New York.

Q. Are you currently employed?

A. Yes, I am.

Q. And where are you employed?

A. I'm employed at the Stony Brook University.

Q. What is your current position?

A. I'm a Professor of chemistry and also associate Dean for curriculum.

Q. What is your area of expertise?

A. I'm an expert in organic chemistry and chemical biology.

Q. What is organic chemistry?

A. Organic chemistry is the study of molecules which contain carbon atoms.

Q. Is copolymer-1 an organic compound?

A. Yes, it is copolymer-1 contains carbon atoms amongst other types of atoms.

Q. And what is chemical biology?

A. Chemical biology is using molecules to study the function of biological systems.

Q. What are some of the applications of chemical biology?

A. Often times these molecules when they perturbed biological function, they can be developed into either drugs or they can be developed as diagnostic agents.

Q. Would you summarize for the Court your educational background, starting with college?
A. Yes. I obtained my Bachelors of Science in chemistry at Harvey Mudd College, and from there I obtained a Ph.D. in chemistry at UC Berkeley, and that was in 1990.
Q. What was the subject of your Ph.D. work?
A. Primary focus of my Ph.D. work was synthesis and testing of peptides.
Q. What did you do after receiving your Ph.D.?
A. I went to Harvard University where I undertook a post-doctoral fellowship.
Q. What was the subject of that post-doctoral fellowship?
A. I made proteins to investigate their function.
Q. Are proteins a form of polypeptides?
A. Yes, proteins are polypeptides.
Q. What did you do after your post doc?
A. When I finished my post-doc, I took up a faculty position at Stony Brook.
Q. What are your responsibilities at Stony Brook?
A. I do research, I run a research group, I teach and I also have administrative duties responsibilities.
Q. What is your area of research?
A. I have several research areas in my lab. One of the main research areas in my laboratory is making, synthesizing polypeptides and polymers and testing them.

Q. Is your research funded?
A. Yes, it is.
Q. By whom?
A. My primary funding is from the National Institutes of Health and the National Science Foundation.
Q. As part of your research, do you conduct and review the results of biological testing of compounds?
A. Yes, I do. We perform many different types of assays in my laboratory.
Q. How long have you been working with biological tests?
A. I've been performing biological assays since the late 1980's in my graduate work.
Q. Can you give the Court some examples of the types of biological tests that you conduct in your laboratory?
A. Yes. We test both peptides and polymers as to how they can interrupt cells from binding to each other.

We test peptides in terms of how they can inhibit cells from migrating or moving in animal models, as well as in in vitro systems, that's just in the laboratory. And we also test steroids as well as peptides, polymers as anti-bacterial agents.

Q. And these are tests that you conducted in your laboratory?
A. Yes. These tests are conducted in my laboratory by my graduate students, and sometimes they do it in collaborator's laboratories.

Q. You mentioned you also teach courses. What courses do you teach?
A. I teach a wide range of courses from both undergraduate and the graduate level. At the graduate level I've taught organic reaction mechanisms, physical organic chemistry, chemical biology. At the undergraduate level I've taught thousands of students, undergraduate sophomore organic chemistry.
Q. You said you teach a graduate level course in organic reaction mechanisms. What does that mean?
A. So in synthetic organic chemistry, what we're doing is we're making molecules, and making a molecule requires changing the connectivity of the atoms, making new bonds and breaking bonds. So, for example, yesterday in Dr. Gokel's testimony, he showed us how a peptide bond is formed.

An organic reaction mechanism is simply a motion picture that depicts how those atom's connectivity change.
Q. Are you author of any peer-reviewed publications?
A. Yes, I am. I have somewhere on the order of 70 publications.
Q. Do any of those publications discuss the synthesis of peptides?
A. Yes they do. Probably about half of them cover peptides.
Q. And do any of the papers record the results of biological testing of the compounds?
A. Yes. Half or more cover biological testing of compound.

Q. Have you supervised graduate students since you've been working at Stony Brook?
A. Yes. I've graduated about 20 Ph.D. students from my laboratory, and I currently have research group on the order of ten Ph.D. students.
Q. Have you worked with any pharmaceutical companies?
A. Yes. I spent a sabbatical year at Biogen in Cambridge, Massachusetts.
Q. What were you doing at Biogen?
A. At Biogen I was studying the role of the function of proteins in kidney disease and how those proteins interact with immune system.
Q. Have you served as a peer reviewer for any journals?
A. Yes, I have. I've peer reviewed for many different journals. Some of those journals are Journal of Organic Chemistry, Journal of American Chemistry -- the American Chemical Society, ACS Chemical Biology, Chemistry and Biology, Molecular microbiology and many others on top of that.
Q. Do you review articles as a peer reviewer on the synthesis of peptides?
A. Yes, I do.
Q. And do you review articles that contain results of biological testing?
A. Yes, I do.
Q. Are the biological testing that you review in these

articles always the same ones that you actually conducted in your laboratory?

A. No. Quite often they're different than the assays that we, or the tests that we use in my own laboratory.

Q. How are you able to review these biological tests if they're not ones that you actually are conducting in your laboratory?

A. In order to look at the effect of a molecule or compound of biological function, what one needs is a test with a measurable and well defined end point or end product. So once that test is in hand, what you're looking for is simply to compare the effect of the molecule at hand with appropriate controls. And so regardless of the type of test that's being done, what you're looking for is pretty much the same, a change in outcome.

Q. Have you given any invited lectures?

A. Yes. I've given somewhere on the order of 100 invited lectures at various academic institution, internationally and nationally, at conferences nationally and internationally, as well as at companies.

Q. Have you received any awards during your professional career?

A. Yes. I've received several wards. Most notably, I've received the Pfizer Award in enzyme chemistry from the American Chemical Society, and that was for a fundamental study of

enzyme function. I also received American Chemical Society's Co-scholar award in organic chemistry, which was for the study using peptides to look at biological function.

Q. Now, are you an inventor on any patent applications?

A. Yes, I've submitted three patent applications.

Q. What is the general subject matter of those applications?

A. Two of those patent applications are on methods to prepare polymers, polymer chemistry, and one of them is on the use of compounds to treat tuberculosis.

Q. Would you look at PTX-436 in your binder? What is this document?

A. This document is my CV, my curriculum vitae.

Q. Does it accurately summarize your qualifications and experience?

A. Yes, it does.

MS. HOLLAND: Plaintiffs offer PTX-436 into evidence?

MR. JONES: No objection, your Honor.

THE COURT: Admitted.

(Plaintiff's Exhibit 436 received in evidence)

MS. HOLLAND: And, your Honor, plaintiffs offer Dr. Nicole Sampson as an expert in peptide and polymer chemistry.

MR. JONES: No objection.

MR. DOYLE: None, your Honor.

THE COURT: Then I accept the Doctor as such. Go ahead.

Q. Dr. Sampson, I'm going to put up on the screen the Court's construction of the term copolymer-1, and I really want to focus on the requirement that the four amino acids, alanine, glutamic acid, lysine and tyrosine be in a molar ratio of approximately 6:2:5:1.

Were you here for Dr. Gokel's testimony on that subject?

A. Yes, I was.

Q. Did you hear him testify that the Sandoz and Mylan products literally meet that claim limitation?

A. Yes, I did.

Q. Do you agree with that opinion?

A. I agree with Dr. Gokel's opinion.

Q. Now, if the Court were to determine that the Mylan and Sandoz products don't literally meet the requirement of approximately 6:2:5:1, do you have an opinion as to whether the molar ratio in Mylan and Sandoz product is equivalent to approximately 6:2:5:1?

A. Yes, I do.

Q. What is that opinion?

A. My opinion is, is that they are equivalent.

Q. Why is that?

A. If I could have the next slide, please to show my -- how I formed my opinion.

This is data that we've seen before from Mylan's

submission to FDA. And these are the four amino acids that we've been discussing at length; alanine -- or you have been discussing at length -- alanine, glutamic acid, lysine, and tyrosine. And if we look at the ratios 6:2:5:1, exactly 6:2:5:1, I've simply represented that in molar fractions on a scale of one. And if you move the decimal point over to, we could look at that as a percent. So this second column here is exactly 6:2:5:1 in percent, so 42.9 percent alanine, 14.3 percent glutamic acid, 35.7 percent lysine, and 7.1 percent tyrosine.

These are the Mylan's molar fraction data that they submitted. And if we again simply move the decimal point over to express it as a percent, you can see that Mylan's batch one is 42.7 percent alanine, 14.4 percent glutamic acid, 33.6 percent lysine, and 9.2 percent tyrosine. So the total difference in amino acid composition here 4.5 percent and, in my opinion, those are equivalent.

Q. Would you explain just for a moment ho you got to 4.5 percent?

A. Right, thank you. So I should have explained that. I just did the math in my head. But if we look at the difference between alanine for exactly 6:2:5:1, and Mylan's percentage, that's a .2 percent difference in alanine, a .1 percent difference in glutamic acid, a 2.1 percent difference in lysine, and a 2.1 percent difference in tyrosine. So if you

take the sum of those differences, it's a 4.5 percent total amino acid difference. And, again, that's equivalent -- I believe that these mole percentages or molar fractions are equivalent to exactly 6:2:5:1.

Q. Dr. Sampson, I want to focus in on the tyrosine line for a moment. Did you hear Dr. Gokel asked about whether there was a 30 percent difference in tyrosine content between Mylan's molar fraction on exactly 6:2:5:1?

MR. JONES: Your Honor, this is outside the scope of her report. She did no analysis of tyrosine.

MS. HOLLAND: Your Honor, Dr. Sampson's expert reports do cover this, and they also incorporate by reference the Dr. Gokel's report on this issue, and they were welcome to question Dr. Sampson at deposition on this subject.

THE COURT: Unfortunately, I'm not going to have the time to stop now. I'd like to get the testimony in.

MR. JONES: Very well.

THE COURT: I appreciate your objection. I'll consider it.

Go ahead.

MR. JONES: Very good, your Honor.

A. So could you please repeat the question?

Q. Yes. Did you hear Dr. Gokel asked whether there was a 30 percent difference of tyrosine between the seven point -- between the .071 and .092 molar fractions that are represented

here in this slide?
A. Yes, I did.
Q. Okay. Do you disagree as a matter of mathematics that there is a 30 percent difference between .071 and .092?
A. I agree as a matter of arithmetic that there's a 30 percent difference between .071 and .092.
Q. Does that mean that the molar ratios differ from each other by 30 percent?
A. No, it does not.
Q. Can you explain why?
A. Because we're looking at the polypeptide and its composition, one has to look at the composition in its entirety. And you can't simply look at the composition of a single amino acid ignoring what happens to the other amino acids.

So really what happens to the composition of copolymer-1 in going from exactly 6:2:5:1 to Mylan's molar percentages, is there's a 2 percent change 2.1 percent change in the tyrosine content between those two batches of copolymer-1, you will call it a match.

Q. All right. Do you have an opinion as to whether the molar ratio in Sandoz's product is equivalent to approximately 6:2:5:1?
A. Yes, I do. And that -- how I arrived at that is shown on this slide. Again, we have alanine, glutamic acid, lysine and

tyrosine. The first two columns are the same as on the previous slide, but now the molar fraction data is coming from Sandoz submission to the FDA.

Again, I simply moved the decimal point over two places to look at it as a percent. And what you can see is that Sandoz lot is 42.7 percent alanine, which is a .2 percent difference in alanine, 13.6 percent glutamic acid, which is a .7 percent difference in glutamic acid, 34.4 percent lysine, which is a 1.3 percent difference in lysine, and 9.3 percent tyrosine, which is a 2.1 percent difference in tyrosine.

So taking that percent difference overall, the total difference in amino acid content is 4.4 percent, and, in my opinion, that's equivalent to -- this difference is insubstantial, and this mole percentage is equivalent to this mole percentage over.

Q. When you said this. Just for the record -- sorry.

A. Sandoz mole percentage is equivalent to the mole percentage in exactly 6:2:5:1.

Q. And is it equivalent to the mole percentage of approximately 6:2:5:1?

A. And it's also equivalent in a mole percentage of approximately 6:2:5:1.

(Continued on next page)

Q. Now, what would this approximately 4 percent total difference in amino acid molar ratio from exactly 6:2:5:1 mean in terms of an actual copolymer-1 polypeptide?

A. If I could have the next slide, please. As I mentioned before, one has to think about this in terms of the overall composition and what's shown here is a 70 amino acid copolymer-1. Shows in as 70 amino acids because that corresponds to a molecular weight of about 7-1/2 kilodaltons and if we take the molar ratio of exactly 6:2:5:1 that means that there are 30 alanines, 10 glutamic acids, 25 lysines and 5 tyrosines. If there's a 4 percent different or a 4.4 percent difference, what that amounts to is one amino acid changes and now you have 30 alanines, 10 glutamic acids, 1 less lysine, so 24 lysines and 1 more tyrosine, so that's 6 tyrosines.

So a 4 percent total difference is simply a way of representing how much does the overall composition of the polypeptide copolymer-1 change and as I said it corresponds to a one amino acid change.

Q. Have you reviewed any literature that supports your opinion that this type of difference in molar ratio for copolymer-1 would be insubstantial?

A. Yes, I have.

Q. What did you review?

A. I reviewed a paper by Teitelbaum and co-workers which was published in 1971.

Q. Would you turn to PTX 499 in your binder?
A. Yes, I have it.
Q. Is this the Teitelbaum reference you were referring to?
A. Yes, it is.
MS. HOLLAND: This document is already in evidence, your Honor.
THE COURT: Yes.
Q. Is this article referred to in the specification of the patents in suit in this case?
A. Yes, it is.
Q. All right. Dr. Gokel discussed the molar ratio data here in some detail, but I want to focus on one particular aspect of the article. Let's go to table 8 on page 247. This is entitled specificity of EAE supression. Could you explain what's being referred to here?
A. So with this table the authors report their data on biological testing in the EAE model for MS and EAE is experimental allergen encephalomyelitis. This is a model in guinea pigs in which the disease is induced by injecting the animals with EE or basic encephalitogen as shown under their treatment conditions. And what they're testing in the data they're reporting here is whether various copolymers can suppress the disease in these guinea pigs in this animal model for MS.
Q. And can you explain the results that are reported here?

A. Yes. So if we focus on the first three lines, control and clinical incidence, actually, thank you, what is going on here is these animals as I mentioned, the EAE has been induced, they have a disease and now they're treated either with a control or with batch one of copolymer-1 or with batch 2 of copolymer-1 so they're two different synthesized batches of copolymer. And then they're treated three times at five days apart, and then at the end of the experiment, the animals are analyzed for whether they have the clinical symptoms of disease which happen to be hind leg paralysis.

In the control 64 percent of the animals have EAE whereas when they're treated with copolymer batch 1 only 22 percent of the animals have EAE at the end point of this assay, which means that the EAE has been suppressed. And if you look at treatment with copolymer-1 batch 2, again, only 23 percent of the animals have EAE, that is, the EAE has been suppressed by treatment with batch 2 of copolymer-1.

Q. What were the molar ratios amino acids in these two batches of copolymer-1?

A. So those molar ratios are in table 1, if we could go back to table 1. Page 243. And so this table is simply a composition of copolymer-1, I believe we've seen this before, the four amino acids; alanine, glutamic acid, lysine and tyrosine and batch 1 has a molar ratio of 6.0 alanines to 1.9 glutamic acids to 4.7 lysines to 1.0 tyrosines. Batch 2 has

6.7 alanines to 2.1 glutamic acids to 4.2 lysines to 1.0 tyrosine.

Q. Is there some variation molar ratio between these two batches and exactly 6:2:5:1?

A. Yes. The molar ratios vary somewhat. If we could go to the next slide. I've calculated that. So again, alanine, glutamic acid, lysine and tyrosine. Here are the molar percentages for exactly 6:2:5:1 and I've used two significant figures, since that's what's used in the Teitelbaum 1971 paper. Batch 1 is 44 percent alanine, so 1 percent more alanine; 14 percent glutamic acid, so the same as exactly 6:2:5:1; 35 percent lysine, so 1 percent less lysine than exactly 6:2:5:1 and 7 percent tyrosine, so the same amount of tyrosine.

Contrast batch 2 is 48 percent alanine, so 5 percent more alanine, 15 percent glutamic acid, so 1 percent more glutamic acid. 30 percent lysine, so 6 percent lysine, and 7 percent tyrosine.

So if we look at for batch 1 the total amino acid difference between exactly 6:2:5:1 and batch 1 it's 2 percent, and in the case of batch 2, the total amino acid difference is 12 percent.

Q. How did these two batches of copolymer-1 compare to each other in the results of the EAE test?

A. If I could have the next slide. What's shown on the left here is exactly what was I just went through on the previous

slide, so we'll call that batch 1 differed by 2 percent amino acid composition from exactly 6:2:5:1 and batch 2 differed by 12 percent amino acid composition from 6:2:5:1 and then this is a repeat of the EAE supression data. Just to point out to you these percents are not amino acid composition percents, these are percentages of clinical incidence of EAE. So batch 1 suppressed, the clinical incidence is reduced from 64 percent to 22 percent, and copolymer-1 batch 2 reduce the clinical incidence from 64 percent to 23 percent, so the amount of supression is very similar between these two batches of copolymer-1.

Q. Could we go to page 247 of the article, please, and the discussion section? Thank you. The second paragraph in the discussion. Did Professor Arnon and the other authors here indicate whether they believed the amino acid compositions of batch 1 and batch 2 of copolymer-1 to be comparable?

A. Yes, they did. They said that the amino acid composition was the same.

Q. And did the authors characterize the results of the EAE testing on the two batches of copolymer-1?

A. Yes, they did. In the same sentence they said they stated that the biological activity was similar for both batches of copolymer-1.

Q. How did the amino acid molar ratios of Mylan's product and copolymer-1 batch 2, the Teitelbaum reference, compare to

exactly 6:2:5:1?

A. So I've pulled those data together on the next slide, going to look at that side by side, and these are the same numbers that we've seen before; alanine, glutamic acid, lysine, tyrosine, exactly 6:2:5:1. These are the percents for Mylan's submission to the FDA and recall that the total percent difference in amino acids was 4.5 percent and here are the numbers from Teitelbaum 1971 batch 2 of copolymer-1 and recall that percent total difference amino acid composition is 12 percent. So in fact, in terms of total amino acid differences, batch 2 is less alike exactly 6:2:5:1 than Mylan's batch 1.

So in my opinion, the difference here between Mylan's batch 1 and approximately 6:2:5:1 is insubstantial because batch 2, Teitelbaum batch 2 activity is very similar.

Q. Let's consider Sandoz' product now. How did the amino acid molar ratios of Sandoz' product in copolymer-1 batch 2 in the Teitelbaum 1971 reference compare exactly to 6:2:5:1?

A. So once again, we have the mole percent of exactly 6:2:5:1 for alanine, glutamic acid, lysine and tyrosine, and these are the numbers pulled from a previous slide from Sandoz' lot submission to the FDA that was 4.4 percent different in total amino acid differences. Again, Teitelbaum batch 2 had a 12 percent total difference. So as you can see, Sandoz' differences are smaller than those of Teitelbaum batch 2 and so

in my opinion the difference of Sandoz' batch from exactly or approximately 6:2:5:1 is insubstantial.

Q. And just to be clear, does the Teitelbaum paper call batch 1 and batch 2 both copolymer-1?

A. In Teitelbaum these are batch 1 and batch 2. They're two different batches of copolymer-1, yes.

Q. Are you aware that Mylan is taking a position that the molar ratio in its lots should be normalized to tyrosine before comparing to 6:2:5:1?

A. Yes, I am.

Q. Now, in your opinion, if Mylan's molar ratio were normalized to tyrosine, would there be a substantial difference between that normalized molar ratio and exactly or approximately 6:2:5:1?

A. No.

Q. Why not?

A. Because it doesn't matter what scale you normalize on. What matters is the total amino acid percent difference. So if you could go to the next slide. No, back one slide, I'm sorry, this slide. You're ahead of me.

Here are the percentages that, excuse me, the molar fractions of Mylan's data that I normalize to one, a tyrosine of one, so that molar ratio is 4.64 to 1.57 to 3.65 to 1. The total number of amino acids in that molar ratio is 10.86. If we express that as a percent, you see it's 43 percent alanine,

14 percent glutamic acid, 34 percent lysine and 9 percent tyrosine.

Q. Can I stop you there for a second? Could you just explain how you got those percentages from the normalized data?

A. Sure. So the way that I calculated a percent is simply by summing up the total number of moles of alanine, glutamic acid, lysine and tyrosine and that sum is 10.86. So in order to calculate the percent, one simply takes 4.64 alanines and divides by 10.86, so 10.86 is the denominator and then to convert it to a percent multiply it by 100. So that would be 43 percent.

And likewise we can divide 1.57 by 10.86, multiply by 100 and get 14 percent. 3.65 divided by 10.86, multiply by 100, get 34 percent, and 1 divided by 10.86 times 100 is 9 percent. So I've simply converted to a scale of 100 percent.

And if we look at Mylan's molar fraction data, convert it to percent and I rounded just simply for clarity, 43 percent is the same as 43 percent, 14 percent glutamic acid is the same, whether it comes from normalized tyrosine or from the molar fractions; 34 percent is the same as 34 percent and 9 percent tyrosine is the same as 9 percent tyrosine. It doesn't matter what scale you're on. It's simply what percent of the total mixture is that particular amino acid of interest.

Q. Were you here when Dr. Gokel was shown some papers that had molar ratios for Copaxone that were similar to these normalized

numbers?
A. Yes, I was.
Q. Can those normalized numbers be compared directly to 6:2:5:1?
A. No. One has to be on the same scale. So again, you have to either be on a scale of 10.86 for all of the numbers that you're comparing, a scale of 14 for all of the numbers that you're comparing, a scale of 1 for all the numbers you're comparing or a scale of 100 percent for all the numbers you're comparing. You just have to be on the same scale before you compare the identity of the numbers.
Q. Dr. Sampson, you testified earlier that the overall percent difference between Teitelbaum batch 2 of copolymer-1 and exactly 6:2:5:1 was 12 percent. Can you explain what that would mean in terms of an actual copolymer-1 polypeptide?
A. Yes. So this total percent difference that we're talking about is simply a mathematical representation that can scale to whatever size polypeptide we're looking at. So if we look at a 70 amino acid polypeptide, which I showed you earlier and on the top, is exactly 6:2:5:1, 30 alanines, 10 glutamic acids, 25 lysines, 5 tyrosines, then this is what that 70 amino acid copolymer-1 looks like.

If there's a 12 percent difference in amino acid composition, what that means is that four amino acids will change. So I've drawn that out in the bottom here. We go from

30 alanines to 33 alanines, that's plus 3 amino acids. From 10 glutamic acids to 11 glutamic acids that's plus an additional amino acid and 25 lysines is reduced by 4 to 21 lysines and 5 tyrosines stays 5 tyrosines. So a 12 percent total amino acid difference means that 4 amino acids will change.

Q. Now, how did these four amino acids changing compare to how Mylan and Sandoz' drug substances would change in an actual copolymer-1 polypeptide?

A. As I mentioned earlier their total amino acid percent difference were on the order of 4 to 4-1/2 percent and that corresponds to a 1 amino acid change. So this is Teitelbaum batch 2 of copolymer-1, it has the same biological activity, it has -- excuse me, this is Teitelbaum 1971 batch 2 copolymer-1, did I say that right? It has the same biological activity as batch 1. It's 12 percent different, 4 amino acids different than exactly 6:2:5:1. The Sandoz and the Mylan drug substances are within that amount of difference. There's only a 1 amino acid difference if you look at a 70 amino acids polypeptide, so my opinion is that they're substantially different.

Q. Dr. Sampson, does this sum up in your opinion is the molar ratio in Mylan's products equivalent to approximately 6:2:5:1?

A. Yes, it is my opinion that Mylan's product is equivalent to approximately 6:2:5:1.

Q. And in your opinion, is the molar ratio of Sandoz' product equivalent to approximately 6:2:5:1?

A. Yes, it is my opinion that the Sandoz product is equivalent to approximately 6:2:5:1.

MS. HOLLAND: Thank you, Dr. Sampson.

THE COURT: You may proceed.

MR. JONES: Thank you, your Honor.

CROSS-EXAMINATION

BY MR. JONES:

Q. Dr. Sampson, my name is David Jones. I represent Mylan. I'll be talking to you for not too long this afternoon. Do you want some water?

A. I have, thank you.

Q. I appreciate what your lab does, but I want to be clear. Your lab didn't do any bioassays on copolymer-1, is that correct?

A. That is correct.

Q. You didn't do any bioassays on Mylan's proposed ANDA product, correct?

A. That is correct.

Q. And you haven't done any bioassays on Copaxone, the drug that's sold as Copaxone by Teva, correct?

A. That's correct.

Q. And you based your opinion basically on the Teitelbaum paper, correct?

A. I used the Teitelbaum analysis, yes.

Q. That's the only bioassay analysis that you cite in your

paper, correct?
A. I'm not sure what you mean by my paper. I didn't write any papers on copolymer-1.
Q. I'm sorry, you didn't write any papers on copolymer-1, but you have done an expert report in this case, correct, a supplemental expert report?
A. I've written several reports, yes.
Q. Okay. And of all those reports, the only bioassay that you did, especially in the supplemental report is the bioassay referred to in the Teitelbaum 1971 paper, correct?
A. I'd have to go back and look through my reports, but that's my recollection.
Q. And that's the study on rabbits, right?
A. Pardon me?
Q. I'm sorry, not rabbits. Guinea pigs, the '71 Teitelbaum is an assay on guinea pigs, correct?
A. As I just discussed in my direct testimony EAE suppression was studied in guinea pigs.
Q. So for your determination of equivalence you haven't relied on any studies that look at Mylan's ANDA product how that product might effect or have a bioeffect on humans, correct?
A. If you're asking have I reviewed any of Mylan's clinical human data, is that the question?
Q. I guess it's a little simpler, it's just in reaching your opinion on equivalence which you just gave you didn't rely on

any bioassay studies on the effect of Mylan's product on humans, correct?

A. No, I didn't use any Mylan studies.

Q. And so the only bioassay you looked at was the bioassay that assessed how copolymer-1 as it was made back in 1971 affected guinea pigs, correct?

A. That's correct.

Q. I do want to focus on what happens to tyrosine as copolymer-1 has evolved over time. Could I please have some slides? Dr. Sampson, what I did here, I have a table here of tyrosine molar fractions, and I got the data from your slides 2 and 7, so a report that molar fraction for tyrosine for exactly six-two-five-one molar fraction for Teitelbaum batch 1 and Teitelbaum batch 2, you presented them as a percentage but we have them here as molar fractions, and then the Mylan molar fraction for tyrosine, .092, is that clear?

A. Those look like molar fractions of tyrosine that we saw before.

Q. That we saw in your slides, correct?

A. Mm-hmm.

Q. I want to first, when we compare what happens to tyrosine when we go from exactly six-two-five-one to Teitelbaum batch 1, we see that the percentage difference and I showed my math, the percentage difference here in the amount, the molar fraction amounts is 1.4 percent, correct?

A. I agree with your arithmetic. .001 times .071 times 100 is 1.4 percent. I don't agree with how you're doing molar fractions.

Q. When you compare what happens with tyrosine from batch 1 to batch 2, I don't have to show the math that's a zero percent increase, correct?

A. Those two numbers are the same.

Q. Right and when I look to see what happens from either Teitelbaum batch 1 or Teitelbaum batch 2 because they showed the same amount of tyrosine, what happens when you go to Mylan, the product that's made using phenol, you see a tyrosine increase of 31.4 percent, correct, in the molar fractions?

A. Incorrect.

Q. Did I divide wrong there, Doctor?

A. No, your arithmetic is fine.

Q. All right, and when you do the arithmetic, you see that 31.4 percent increase from batch 1 or batch 2 in Mylan's product, correct?

A. No.

Q. Let's take a look now at what happens when you compare Mylan -- what happens to the Mylan product when you compare it to exactly six-two-five-one? You see that the tyrosine molar fraction has increased 29.5 percent correct?

A. No.

Q. Is my math incorrect?

A. Your arithmetic is fine.
Q. And does my arithmetic reflect the calculation one would use to find percentage change in two numbers?
A. It is how you can look at the percentage change in two numbers.
Q. All right. Now, I'd like to have up your slide six. And again, what you're showing here is in Teitelbaum batch 1 and batch 2. You've got no percentage change in the tyrosine, right?
A. Teitelbaum batch 1 has 7 percent tyrosine and Teitelbaum batch 2 has 7 percent tyrosine and exactly 6:2:5:1 has 7 percent tyrosine, yes.
Q. And I want to, just so that we're clear because there's been a lot of talk about the molar fraction, can I have in this zeroing out PTX 4299, the Teitelbaum report you referred to in your examination, and if we could go to page 243. That's the column with the batch 1 and the batch 2 in the molar ratios. Pull that out. We're talking about you have to put things on the same scale correct?
A. They have to be on the same scale in order to compare them directly, yes.
Q. So you agree with me that when the inventors of copolymer-1 were reporting their molar ratio and coming to the assessment that they were the same product, you'd agree that they didn't put these two molar ratios on the same scale, correct? What

does batch 1 add up to?
A. May I use the calculator that's sitting up here?
Q. I'll tell you what, you can take my representation that it adds up to 13.6.
A. Thank you. So I'll take it on your word that it's 13.6.
Q. And then batch 2 adds up to 14, correct?
A. That's my recollection, correct.
Q. And that's not the exact same scale, correct?
A. Those aren't the exact same scale.
Q. No. So the copolymer-1 inventors didn't see a need to multiply things by 14 or put their molar ratios on the same scale when they were calculating for molar ratio in copolymer-1, correct?
MS. HOLLAND: Objection, your Honor.
THE COURT: Sustained.
A. I don't know what the inventors did.
MS. HOLLAND: No, don't --
THE COURT: That's exactly the reason why.
Q. That's why she sustained the objection.
A. I've always had a hard time with the word "sustained."
Q. If we go back to, well, actually, yes, let's go back to your slide 6. There were a couple of questions I had on that.
You were here when my colleague, Mr. Anstaett went through the series of papers that the copolymer-1 inventors had done since the 1971 paper and you heard that testimony about

how the inventors when they specified a molar ratio referred specifically to the batch 1 molar ratio, correct?

MS. HOLLAND: That wasn't the testimony.

THE COURT: All right. Do you want to rephrase that?

Q. Sure. When there was a specific reference, when the inventors of copolymer-1 in their articles after the '71 Teitelbaum study, so when the inventors of copolymer-1 would specify when they would actually write out in an article or a publication a molar ratio, the molar ratio that they wrote out was the batch 1 ratio, correct?

MS. HOLLAND: Your Honor, I think the problem is that Dr. Gokel was shown specific papers with specific numbers and I think there's some sort of generalization on her testimony based on that that was not on direct.

THE COURT: Can you do it with the exhibits?

MR. JONES: I could do it. It would take a little more time. I'll try to ask a cleaner question see if we can move along, not try anybody's patience.

THE COURT: All right.

Q. I'll ask it this way: You were here for the testimony of Dr. Gokel, correct?

A. Yes, I was.

Q. And you were here for the examination of Dr. Gokel by my colleague, Mr. Anstaett, correct?

A. Yes, I was.

Q. As well as his redirect, you were here for that testimony, correct?
A. Yes, I was.
Q. Do you recall, I'm just asking you what you recall, do you recall seeing any reference after 1971, any specific time when the inventors of copolymer-1 wrote down the molar ratio that's reflected from batch 2, do you remember that at all?
A. I don't recall.
Q. And when I look at your table here, I see 2 percent, that 2 percent difference between Teitelbaum batch 1 and exactly 6:2:5:1, do you see that?
A. Mm-hmm.
Q. Right?
A. Yes.
Q. That 2 percent, that's in fact the experimental accuracy range that was developed on the, that Teva had developed for copolymer-1 as of 1995 when they were doing their amino acid analysis. Do you remember the exhibit on that?
A. I'm not familiar with that.
Q. Were you here in the courtroom when my colleague showed Dr. Gokel the Teva document that specified that amino acid analysis precision was at a level of 2 percent?
A. I recall you putting that up, but I've not reviewed that document.

(Continued next page)

BY MR. JONES:

Q. And if you got precision level of 2 percent, that's a fair, that's a fair assessment of approximately, right? If you have precision at 2 percent, then approximately will cover that 2 percent experimental accuracy range, right?

A. I'm very unclear what you're referring to 2 percent of.

Q. Is experimental accuracy, is that a fair concept to incorporate when you're trying to figure what the term approximately means?

THE COURT: I'm confused as well, Mr. Jones.

MR. JONES: All right.

THE COURT: Are you talking about, I don't know, reproducibility of results, margins of errors, what are we talking about?

Q. That's precisely it. Reproducibility of results, margin of error and calculation, are those fair types of concepts to consider when you're determining whether something falls approximately within a range?

A. I'm not sure that they're related in this context, directly related in this context.

Q. Just so we are clear, if I could have up DTX-2047 at TEV-3370?

MS. HOLLAND: Your Honor, I'm going to object. I think Dr. Sampson already said she wasn't familiar with the document. The document was already read into the record, I

believe, during Dr. Gokel's testimony. I'm not sure there's anything else this witness can add to this document.

THE COURT: Well, what's the question?

BY MR. JONES:

Q. The question simply is is repeatability and producibility, are those two concepts, do they have any relevance in your mind when you're trying to determine the meaning of approximately when you are reporting on a molar fraction?

THE COURT: Can you answer that? I think you may have already.

A. As I said before, approximately is, is not directly related to repeatability or producibility. It might include it, but that's not all there is to it.

Q. And you would include in your idea of approximately includes though Teitelbaum 2, is that correct?

A. One can perhaps look at it that way. I include Teitelbaum 2 because it's equivalent.

Q. Okay. Now, as we showed earlier, you'd agree, if not on the percentage change, you would agree that tyrosine or that Mylan's ANDA product has more tyrosine than was reported in the products that were the subject of Teitelbaum 1971, right?

A. I would agree that if we look at 70 amino acids, polypeptide, Mylan has one more tyrosine.

Q. And if you look at millions of billions of polypeptides, which is what you get when you're actually producing copolymer

or Copaxone or Mylan's ANDA product, millions and bills, you're going to have millions and billions of more tyrosines, correct?
A. No.
Q. Doctor, do we know, is it your understanding -- or I'll ask it this way.
It's true, isn't it, that we really don't fully understand the way that glatiramer acetate exerts its effect on patients with MS?
A. I haven't reviewed papers to look at them.
Q. Well, were you here for the first day of testimony?
A. No, I was not here for the entire day.
Q. Could I have PTX-697, page 4? 697 was -- is an exhibit that was admitted under Mr. Congleton's examination. And when we look under mechanisms, I'll represent to you that PTX-697 is the label for Copaxone, all right?
A. Okay.
Q. If we look under 12.1 one, mechanism of action, we see that Teva says that the mechanism or mechanisms by which glatiramer acetate exerts its effects in patients with MS are not fully understood.
That's what Teva says. Do you have a reason to dispute that?
A. I agree that the sentence up there says that the mechanism by which glatiramer acetate works is not fully understood.
Q. Do you fully understand the mechanism by which glatiramer

acetate works on humans?
A. I have no comment. I mean --
Q. Do you understand what role tyrosine plays in the action of glatiramer acetate on the human body?
A. Tyrosine is one component of glatiramer acetate.
Q. Exactly. Do you know what role it plays in the treatment of MS?
A. I know that it's part of the drug substance.
Q. You didn't cite any test that compared what happens when you increase or decrease levels of tyrosine, glatiramer acetate, did you?
A. I cited the tests between batch one and batch two where the molar amino acid composition changes between the two.
Q. And the tyrosine remained the same, correct?
A. Percent tyrosine there is the same.
Q. So the answer to my question is, you didn't review or didn't cite in your report any studies that analyzed how the effectiveness of glatiramer acetate might change when you increased the level of tyrosine, correct?
A. No.
Q. We really just don't know, do we?
THE COURT: I think it's been answered.
MR. JONES: Nothing further, your Honor. Thank you.
THE COURT: All right.
MS. HOLLAND: No redirect, your Honor.

MR. DOYLE: No questions, your Honor.

THE COURT: All right.

Thank you, Dr. Sampson, you may step down. You're excused.

(Witness excused)

THE WITNESS: Okay.Ms. Holland.

MS. HOLLAND: Yes, your Honor. As we discussed this is our last live witness, but we do have deposition designations. We plan to be to be able to submit those to the court on Tuesday morning. So what we were thinking is that we would submit those to the Court, and then rest first thing Tuesday morning, and then get on with the defendant's case.

THE COURT: Let me ask you this. These will be destinations and counter designations in one? Okay.

MS. HOLLAND: Yes.

THE COURT: And counter counter designations?

MS. HOLLAND: No. I think however many counters there are will be in one place, your Honor.

THE COURT: Very good. As they're done, could you submit them on a rolling basis, by any chance?

MS. HOLLAND: Yes.

THE COURT: If you have one --

MS. HOLLAND: Today, your Honor, we'll deliver some to chambers.

THE COURT: Witness by witness deposition, that would

be great.

MS. HOLLAND: We can do that.

THE COURT: We appreciate that. Okay.

Yes.

MS. BLOODWORTH: Just for a housekeeping matter of the redaction, I believe we usually in the July trial we submitted the deposition designations, as well as the exhibits. The parties haven't had a chance to redact those exhibits yet, but we'd be happy to provide replacement copies for the record once those are complete.

THE COURT: Okay. Why don't we do it that way, then.

Anything else? Great, all right. So I guess -- I'm not here Monday, but we'll start up Tuesday morning 9:30.

MS. BLOODWORTH: Your Honor, if I, may one last thing. We're still working with plaintiffs. We do not have yet from them the scope of their rebuttal testimony of witnesses. We had provided our rebuttal, scope of our witnesses as well as our direct scope of our witnesses, and I hope we could reach resolution on that this evening. But as of right now we don't have for planning purposes what their rebuttal case is going to be.

MS. HOLLAND: Your Honor, as we explained to defendants, we can today give them the scope of what our, we plan for our experts to state. We actually don't know for sure because we're going to be rebutting a case that hasn't been put

on yet.

THE COURT: Right.

MS. HOLLAND: So we will do it as expeditiously as possible, and hopefully by Tuesday we'll have an agreement.

MS. BLOODWORTH: Your Honor, if I may, just for clarification. Our case has been fully provided to plaintiffs in pretrial brief, our pretrial disclosures, our expert reports. We've also provided them with a summary of the expected testimony of our case in chief. And we have planned, for planning purposes, I need to know whether or not certain experts that need to be here or need to go home. And I think it's, at this point in time a week away from trial, I just don't see why plaintiffs don't have a guesstimate as to the scope of their eight rebuttal witnesses, three of them are fact witnesses who haven't put any expert disclosures in this case.

MS. HOLLAND: Your Honor, fact witnesses we don't need to put in expert disclosures, they're fact witnesses. We have them on the rebuttal list because we actually want to hear the testimony that goes in rebuttal to see if we need any fact witness to rebut any factual issue that comes up during the defendants' case. We told defendants that we could give them scope of the expert testimony today if they wanted it. The fact witnesses we really literally don't know what they're going to be saying until we hear defendants' case and see if there's anything factually that needs to be rebutted.

MS. BLOODWORTH: Your Honor, the fact witnesses on their list are fact witnesses that are highly specialized, have highly specialized knowledge, and I think that they are appropriate.

THE COURT: Who are we talking?

MR. DOYLE: Your Honor, more fundamentally, there's a disconnect here. If that witness on their list tell a development history back in the 70's, 60's, our fact witness is Dr. Bishop who is involved in the development of our ANDA, our processes in the late 2000s. So, again, there's no relationship here between -- there is a and seek going on here. And it is very difficult for us to tell our witnesses anything, prepare in any way.

Our rebuttal witnesses are completely disclosed, the scope has been -- was disclosed. It was disclosed well before they started their or the time they started their case, so again, there is --

THE COURT: Are we only talking about the disclosure -- you're obviously prepared to give them the disclose on the experts.

MS. HOLLAND: Yes, your Honor.

THE COURT: Ms. Holland?

MS. HOLLAND: Yes.

THE COURT: So this issue is over three fact witnesses.

MS. HOLLAND: I believe that's correct.

THE COURT: And these are developmental witnesses about the development of the product.

MS. HOLLAND: Well, for example, your Honor, I mean we saw in the opening that Sandoz put on a lot of stuff about Teva's development, and we don't know exactly what's going to come in through their witnesses and whether there will be a need to rebut something or not. We just don't know.

So, yes, I think generally, yes, their witnesses who have knowledge about things that occurred in the past, but that seems to be part of defendants' case for now. So we can't -- sorry.

MR. DOYLE: We can't have fact witnesses of our own about that because we weren't their. We have the depositions of their witnesses, which we have submitted to your Honor. That's in the record.

THE COURT: All right. Look --

MS. BLOODWORTH: Your Honor, I'm sorry to interrupt. One point. I would like sufficient information about what they believe the scope of their fact witnesses would be so we can make a determination whether or not we do have any issues to raise.

THE COURT: It sounds like at this moment Ms. Holland doesn't know. Is that fair?

MS. HOLLAND: Yes, your Honor. I told Ms. Bloodworth

that if she puts on her witnesses at the beginning of next week, by Wednesday we should be able to tell them whether we're going do have any fact witnesses that are going to be called in rebuttal on Mylan's case. So we're not talking about a --

THE COURT: Based on what you know about their witnesses testimony right now, you don't think you're going to need your fact witnesses, but you're concerned, is that the --

MS. HOLLAND: Yes.

THE COURT: -- order?

MS. HOLLAND: More or less, your Honor.

THE COURT: So, all right. I don't know what to tell you.

MS. BLOODWORTH: Your Honor, if it's not a plan; you know, if it is just purely a rebuttal for maybe explaining a document that was perhaps was shown during rebuttal, that would be --

THE COURT: If it goes beyond that and you're prejudiced, you can ask me for a brief adjournment or something else, okay?

MS. BLOODWORTH: Thank you, your Honor.

MR. DOYLE: Thank you, your Honor. So but do I understand we are going to get a disclosure of your expert witness, rebuttal witnesses that you're planning we're going to get that very soon?

MS. HOLLAND: Yes.

MR. DOYLE: When?

MS. HOLLAND: We already discussed that. We said today.

MR. DOYLE: That's perfect. Thank you.

THE COURT: Good. All right.

So I'll watch for the deposition designations. I mean, to the extent that you can get them in on a rolling basis, we appreciate it.

MS. HOLLAND: We're going to do our best, your Honor. It's just that we have to go back and forth between plaintiffs and defendants because --

THE COURT: I understand that. And, you know, even if you get me some of them or couple of them, whatever, it's better than us just waiting until Tuesday. I appreciate that.

Okay, so I'll see everybody 9:30 Tuesday.

MR. HASHMALL: Thank you, your Honor.

MS. HOLLAND: Thank you, your Honor.

(Adjourned to September 13, 2011 at 9:30 a.m.)

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